

For Men Who Manage

JANUARY 1957

# chemical processing

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LEADERS LOOK AT 1957 . . . . .

What do top men of the chemical processing industries  
foresee for the new year? . . .  
see **CHEMICAL BUSINESS**, page 21

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## **NEW! Valuable Information on Sulfuric Acid in this big, fact-packed data book...**

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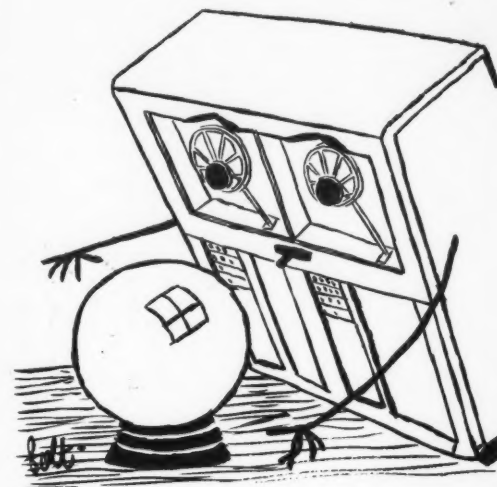
## **GENERAL CHEMICAL DIVISION**

**ALLIED CHEMICAL & DYE CORPORATION**

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When inquiring check 1000 opposite last page

**THAT'S  
INTERESTING**



### **Brain predicts its future**

Readix, an electronic brain, is guiding operating policies at J. B. Rea Co., of Santa Monica, Calif. Since the company is primarily concerned with development of Readix, the machine literally predicts its own future. Management assumptions on costs, future prices, and other vital factors are fed to the brain which forecasts, for years ahead, future earnings. Results are used to best operating policies.

### **Stroboscopy**

General Electric-Detroit Arsenal engineering team has succeeded in making motion pictures of the innards of an engine while it is running. Technique, called stroboscopy, utilizes surging radiation pulses—416 per second—accurately synchronized with the moving part.

Pulses are supplied by GE's betatron, operating at 5 million to 15 million volts. Thousands of short exposures, 10 to 15 millionths of a second, are superimposed to form a picture in which internal parts of the engine appear to be standing still while actually operating at several thousand revolutions a minute.

### **An oil well in the middle of town**

Drilling an oil well within 100 feet of a sleeping baby without waking it is a trick that is helping Shell Oil Co. tap a rich source of oil within the city limits of Los Angeles. In nearly noiseless drilling a normal steel rig is used, shrouded with soundproofing blankets. Each 7 x 12' blanket is made of two layers of fire-resistant canvas, or plastic stuffed with hair, felt, or glass fiber.

When a well is completed, noiseless electric-powered production equipment is set up in a concrete pit and covered with a grill. The area is fenced, trees and shrubs are planted around it, and well site assumes the aspect of a small park.

(Please turn to page 227)







Over  
the editor's  
shoulder

#### What's ahead in 1957?

Late in 1956, CHEMICAL PROCESSING asked top men in nearly all segments of the chemical processing industries what factors they thought would determine business conditions in 1957. These leaders were asked their thoughts concerning the immediate future of their particular industry. "THE LEADERS SPEAK" (see page 20) reports what they, individually, had to say.

Some key men discuss technological developments. Dr. Robert Charpie, Union Carbide Nuclear Company, suggests nuclear power on a large scale will finally come of age in 1957. Significance of data processing equipment and superior research instrumentation in the pharmaceutical industry is developed by Dr. E. H. Volwiler of Abbott Laboratories. Historic economic importance of synthesizing the natural rubber hydrocarbon and its pilot production during 1957 are mentioned by W. S. Richardson of The B. F. Goodrich Company.

Several others talk over business trends and how they will affect the processing industries. Ernest Hart, Food Machinery and Chemical Corporation, considers several factors—financing and "tight" money, foreign competition, and reasons for continued industry growth. Fred J. Emmerich, President of Allied Chemical & Dye Corporation, compares economic conditions expected in 1957 with those of 1956. Dwight Joyce of The Glidden Company gives reasons for expecting continued economic activity.

The "Leaders" put much thought and care into preparation of these remarks. We commend them to you as sincere, worthwhile evaluations on a subject of great interest to us all—what's ahead in 1957.

*William C. Clarke*

ASSISTANT EDITOR

- For more information on articles and advertisements in this issue, check the Reader Service slip opp. last page

- The product directory, pages 217 to 220, is your guide to all articles and advertisements

- To subscribe to this magazine, see reader-qualification form opp. last page

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### THIS MONTH'S COVER

... pointing up the great breadth of the chemical processing industry, depicts fields discussed in the Chemical Business section by 19 leaders of the chemical industry. What's coming in this new year? Which way are we heading? Starting on page 24, "The Leaders Speak" about the future of our industry, as they see it.



January 16-18. Thirteenth Annual National Technical Conference, Society of Plastics Engineers, Hotel Sheraton-Jefferson, St. Louis.

January 23-25. Association of American Soap and Glycerine Producers, annual convention, Waldorf-Astoria Hotel, New York.

January 23-25. Twelfth Annual Symposium on Instrumentation for the Process Industries, Texas A & M College, College Station, Texas.

January 24. The Chemical Buyers' Group of the National Association of Purchasing Agents, fifth annual mid-winter meeting, Congress Hotel, Chicago.

January 28-31. Eighth National Plant Maintenance & Engineering Conference, Public Auditorium, Cleveland.

January 29. The Chemical Buyers' Group of the National Association of Purchasing Agents, fifth annual mid-winter meeting, Hotel Commodore, New York.

January 31. American Institute of Chemical Engineers, technical session, Nicollet Hotel, Minneapolis.

February 5-7. Twelfth SPI Reinforced Plastics Division Conference, The Society of the Plastics Industry, Inc., Edgewater Beach Hotel, Chicago.

February 25-March 1. Thirteenth International Heating & Air Conditioning Exposition, International Amphitheatre, Chicago.

February 26-28. The 1957 Western Joint Computer Conference, Statler Hotel, Los Angeles.

March 3-6. American Institute of Chemical Engineers, meeting Greenbrier Hotel, White Sulphur Springs, West Virginia.

March 4-8. Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Penn-Sheraton Hotel, Pittsburgh.

March 11-15. Atomic Exposition and Nuclear Congress, Convention Hall, Philadelphia.

March 11-15. National Association of Corrosion Engineers, Thirteenth Annual Conference and Exhibition, Kiel Auditorium, St. Louis.

March 12-13. Chemical Marketing Research Association, conference, Sheraton Hotel, Philadelphia.

March 14-15. National Industrial Conference Board, fifth conference on atomic energy, Benjamin Franklin Hotel, Convention Hall, Philadelphia.

March 18-21. Society of the Plastics Industry Annual National Conference and Pacific Coast Plastics Exposition, Hotel Biltmore and Shrine Exposition Hall, Los Angeles.

March 25-29. Tenth Western Metal Congress and Exposition, Pan-Pacific Auditorium, Los Angeles.

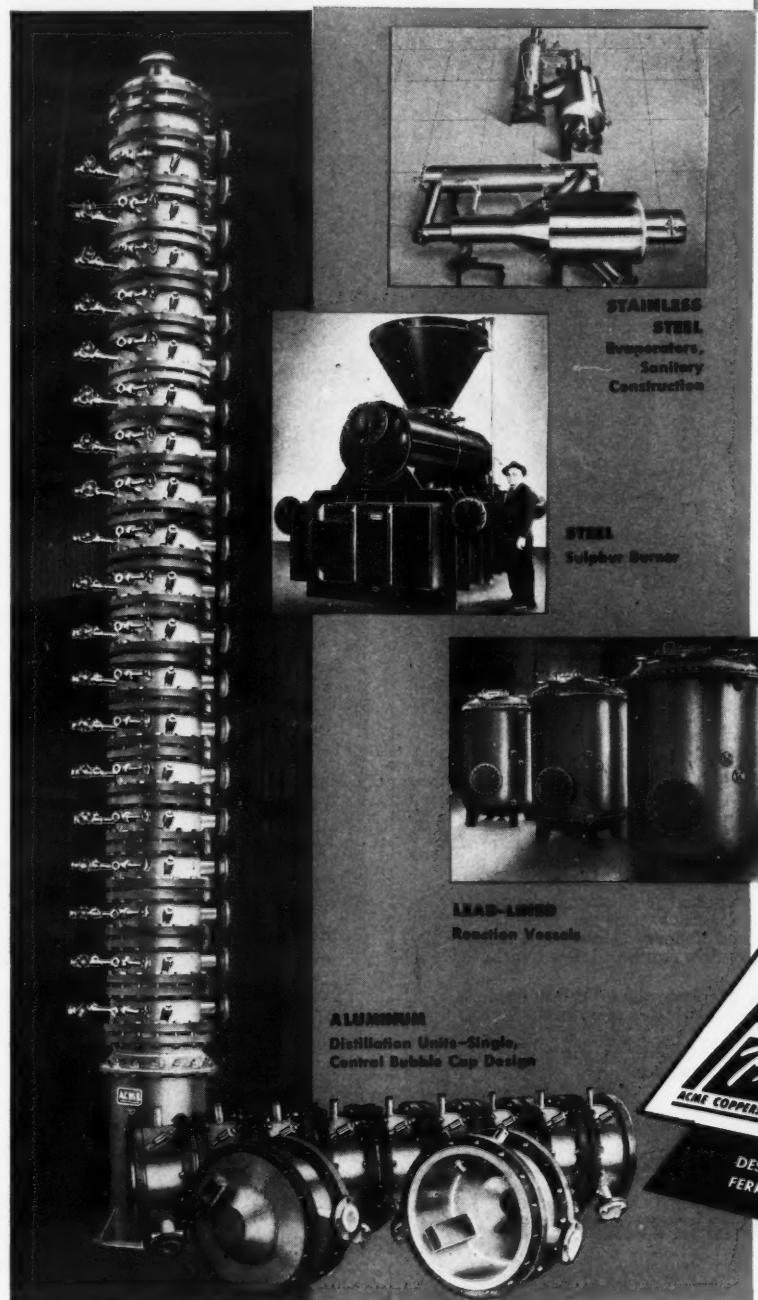
March 27-28. Commercial Chemical Development Association, plastics meeting, Statler Hotel, New York.

March 27-29. Nineteenth Annual American Power Conference, Hotel Sherman, Chicago.

April 7-12. American Chemical Society, national meeting, Miami, Florida.

# VERSATILITY

- \* DESIGN
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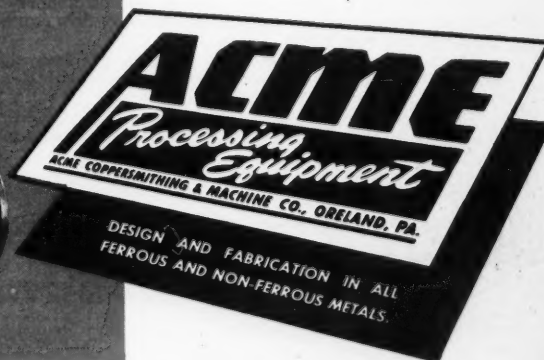
STEEL  
Sulphur Burner

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Reaction Vessels

ALUMINUM  
Distillation Units—Single,  
Control Bubble Cap Design

**I**n the process industries, versatility applies to more than one phase of equipment production. At Acme, versatility includes working with all the ferrous and non-ferrous metals . . . with all types of equipment . . . and with virtually all processes.

For many applications, Acme has developed specialized types of equipment that offer unusual advantages in production efficiency and in operating economy, such as the Patented Sulphur Burner illustrated here. But whether a unit of specialized or of standard design is required, Acme versatility assures the maximum in performance.



DESIGN AND FABRICATION IN ALL  
FERROUS AND NON-FERROUS METALS.

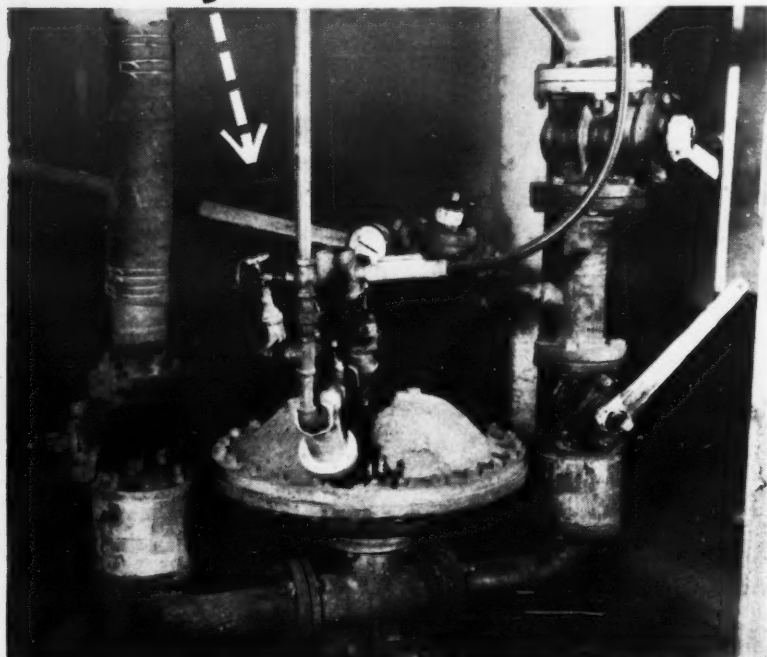
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Only

# OLIVER Diaphragm Pumps

satisfactorily handle  
heavy abrasive slurry at  
MANGANESE CHEMICALS CORP.



*The Problem* at Manganese Chemical Corp., Riverton, Minn., was to find a method of pumping abrasive slurry containing 60% solids. The material — underflow from the thickeners — had to be transferred to a still to be stripped of  $\text{NH}_3$  and  $\text{CO}_2$  in  $\text{MnCO}_3$  processes.

After considering a number of different pumps *The Solution* was provided with the installation of several Oliver Diaphragm Pumps . . . the only pumps that would satisfactorily handle the heavy slurry.

In operation, air pressure of 60-70 psi is applied to diaphragm at regular intervals to force slurry through pump. Each time air pressure is released by an electric timer, about 6 gallons of slurry is moved. A three-way solenoid valve controls the air. Rate of flow can be changed without stopping the operation.

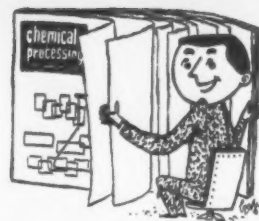
If you have a slurry or liquid handling problem, the ODS Diaphragm Slurry Pump will do the job more efficiently with less maintenance cost. Write for Bulletin 309-R.

Dorr-Oliver engineers, specialists in pump applications, will gladly discuss your pumping problems. Ask for their assistance.

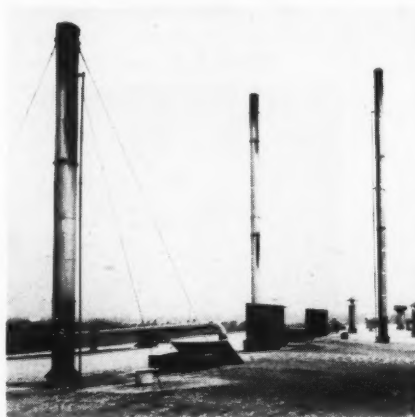
\*Trade Mark Reg. U. S. Pat. Off.



When inquiring check 1003 opposite last page



looking ahead  
to next month . . .



Clear skies above indicate scrubber's effectiveness

## Scrubbers clear the air, keep everybody happy

Fumes, dust and odors from processing plants can cause headaches in more ways than one. Community relations, employee morale, and safety are generally involved . . . and things can be particularly bad if the plant is located around a residential area.

US Rubber Reclaiming Company, Cheektowaga, N. Y., faced this problem. Fumes and sub-micron dust from rubber hydrocarbons and reclaiming oils would escape the building and settle on nearby lawns and homes, leaving a pretty unhappy situation. Odors would sometimes cover an area extending two or three miles from the plant. Inside the plant the atmosphere became fogged, making things unpleasant for workers and creating an explosion hazard.

But now things are different. Company installed three water-type scrubbers, operating with better than 99 percent efficiency in elimination of fumes, and capturing 98 percent of the dust. Installation also permits return of some of the oil to process.

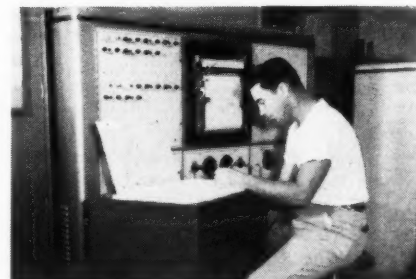
Information came from company's Plant Engineer, William A. Bird, and Associate Editor Ted Meinhold wrote the story that appears in next month's New Solutions section.

## Good to the last two percent

Centrifugal collection of soybean hulls at Spencer Kellogg & Sons' Decatur, Illinois, plant was 98 percent efficient . . . good, but the additional two percent amounted to about 400 pounds of dust daily, a real nuisance as well as a considerable loss of product.

Obvious solution . . . find a collector that got all the dust. And this they did!

CP Assistant Editor Ted Wett went to Decatur to see and photograph the installation, talked to Works Manager John DeLane. The story in February's Engineering & Maintenance section tells about the unit that solved Spencer's dust problem and returns all of the material to process.



Emission spectrometer helps Oronite Chemical maintain close process control

## Twelve times faster . . . and better

If Oronite Chemical Company, Belle Chasse, La., found itself without the use of an emission spectrometer for running analyses on high-test lube oil additives, tests would require services of a dozen or more men . . . and, even then, the plant wouldn't have the close process control it has now, with the unit.

Associate Editor Gordon Weyermuller made a trip to New Orleans for the story and to photograph the installation. He talked to C. L. Jarreau, Technical Service Group Leader, and L. J. True, Operations Planner . . . and the story appears in next month's New Solutions section.

Here's a quick preview  
of features you'll find  
in February **CHEMICAL PROCESSING**



Shown at their recent Kankakee meeting are (left to right) Richard Kron, General Mills Technical Service Manager, Howard T. Von Oehson, Manager of Sales, William Mitchell, General Manager of the Chemical Div., CP Assistant Editor Frank McElroy

### Fatty nitrogen compounds from General Mills

Although fatty nitrogen compounds have long been known to be good cationic surface-active agents for corrosion inhibitors and ore flotation, and use in textiles, plastics, and paint, they are showing much promise as chemical intermediates.

Although basic in fatty acid production, General Mills is now producing a number of fatty nitrogen compounds . . . the nitriles, amines, trimethylene diamines, quaternaries, and amine acetates. CP Editors John Vaaler and Frank McElroy visited General Mills' Kankakee, Illinois, Chemical Division offices to get the latest information about the materials in production. Their findings appear in next month's Chemical Materials section.

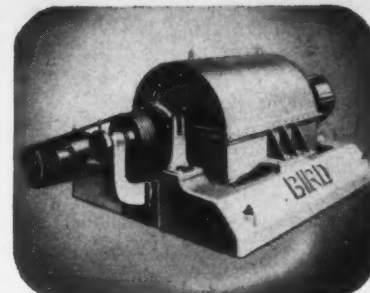
### Eliminates monthly pump rebuilding

Every thirty days a stainless steel centrifugal pump at Atlantic Refining's Philadelphia plant had to be torn down and rebuilt while another went into operation. Pump was handling a highly corrosive slurry which hardened on contact with air, making an abrasive, gritty mass of cutting particles. Now Atlantic has replaced previous pumps with seal-less units, cutting maintenance costs 80 percent and eliminating complete monthly rebuilding.

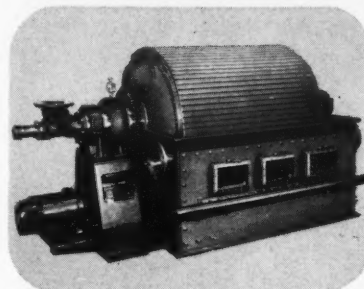
Assistant Editor Bill Clarke got the details from Atlantic's Leslie R. Hendry, Maintenance Engineer, Chemicals Department. The story of how the refinery reduced its pumping costs appears in the February New Solutions section.

## Here's Why You're Most Likely To Find The **RIGHT FILTER** Right At **BIRD**

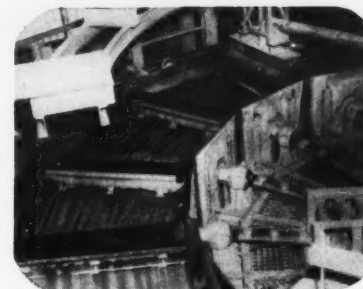
Only at Bird will you find all the different types of separation equipment shown here — your assurance of unbiased recommendations, backed whenever you wish with comprehensive, comparative test findings from the Bird Research and Development Center.



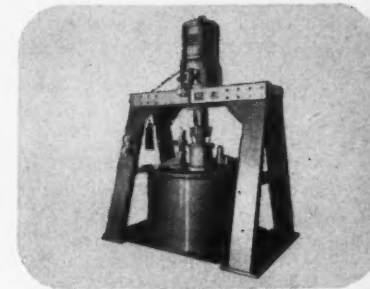
**BIRD CONTINUOUS CENTRIFUGAL FILTERS** for thorough dewatering of large or small volumes of slurries, thick or thin, hot or cold; solids coarse or fine.



**BIRD-YOUNG VACUUM FILTERS** are continuous, rotary, drum type filters designed for high capacity per foot of filter area, complete washing and dewatering and complete discharge of filter cake even when exceedingly thin.



**BIRD-PRAYON VACUUM FILTERS** are horizontal, tilting pan filters designed for continuously efficient removal of solids and thorough multistage wash without dilution of mother liquor. Filter areas from 27 to 516 sq. ft.

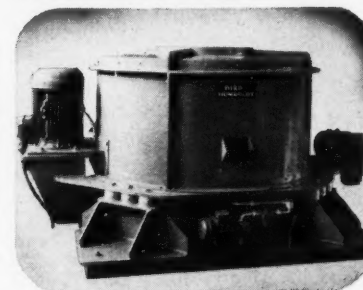


**BIRD SUSPENDED CENTRIFUGALS** are heavy duty, high capacity batch centrifuges with 26", 40" or 48" perforate or imperforate baskets. Fume-tight or explosion proof construction, if needed.

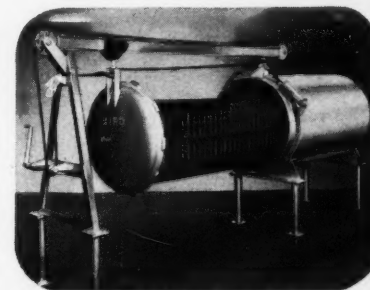


**THE BIRD RESEARCH and DEVELOPMENT CENTER**

is a completely equipped test plant devoted to solids-liquids separation test work in order that the *right* filter may be determined *in advance* of the investment in equipment.



**BIRD-HUMBOLDT CENTRIFUGAL DRYERS** combine screen oscillation with centrifugal force for dewatering coarse or granular solids. They provide continuous flow, high capacity, low power consumption and long screen life.



**BIRD PRESSURE FILTERS** are horizontal tank, vertical leaf filters for large volume, low cost liquid clarifications. Filter areas from 10 to over 1500 sq. ft.

# BIRD

**MACHINE COMPANY**  
South Walpole • Massachusetts

**Leading Authority on Solids-Liquids Separations**

Regional Offices in

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On a warm summer day — residual gases of anhydrous ammonia in unloaded tanks at 100°F can amount to 2% of a full tank. Shell Chemical Corporation, in handling massive quantities of sea-going ammonia, finds . . .

## VAPOR PUMPS

*save pumping time  
save shipping space  
mean good operating practice*

**WILLIAM C. CLARKE**, Assistant Editor  
With **C. L. HEDMAN**, Ammonia Division  
Shell Chemical Corporation  
San Francisco, California

**Problem:** Failure to recover entire load of valuable anhydrous ammonia transported by sea-going barge from Pittsburg, California, to Portland, Oregon, could cost Shell Chemical Corporation shipping capacity for marketable product plus an increased unit freight cost per ton of ammonia. (Barge towing charges, for example, would be allocated over fewer tons of ammonia.) And the barge, depending on weather, makes three trips a month. Single barge load of liquid ammonia is 1700

tons (equivalent to 67 tank cars). The residual vapors in the unloaded tanks could amount to 2% of a full load with a tank vapor temperature of 100°F. However, under normal operating conditions, approximately 1% of the total load, or about 17 tons would remain in the tanks if no attempt were made to recover the residual vapors.

**Solution:** Interesting vapor transfer methods are used by Shell Chemical Corporation to recover the maximum practical amount of ammonia vapor. Developed for rail tank cars and used every day by other

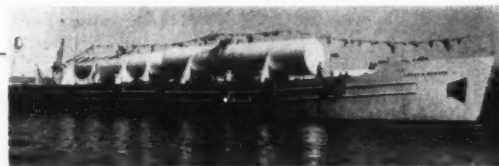
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Two 2700-ton spheres at Pasco, Washington, for storage of anhydrous ammonia. Building at right contains ammonia compressor units

### Here's the "why" behind Shell's use of vapor pumps and the "Ammonia Mariner" to transport anhydrous ammonia

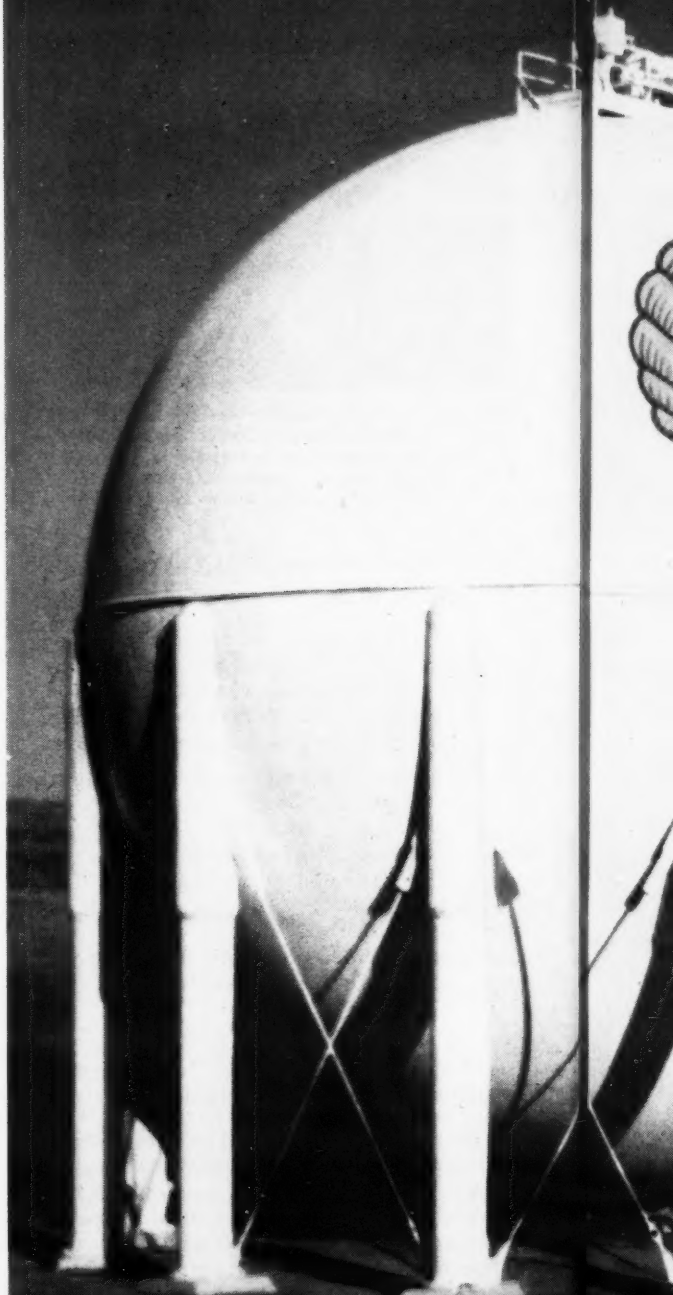
Since 1931, Shell Chemical Corporation has been supplying anhydrous ammonia to West Coast users from the Pittsburg, California, plant. But it wasn't until 1934, with Shell's development of methods for applying ammonia directly to the soil, that liquid ammonia began to be supplied for fertilizer use.

With only one West Coast ammonia plant to handle demand, Shell had to solve the problems of shipping anhydrous ammonia long distances by rail tank car, and transferring it into field storage and application tanks. Vapor transfer methods, described in article, were evolved by Shell.

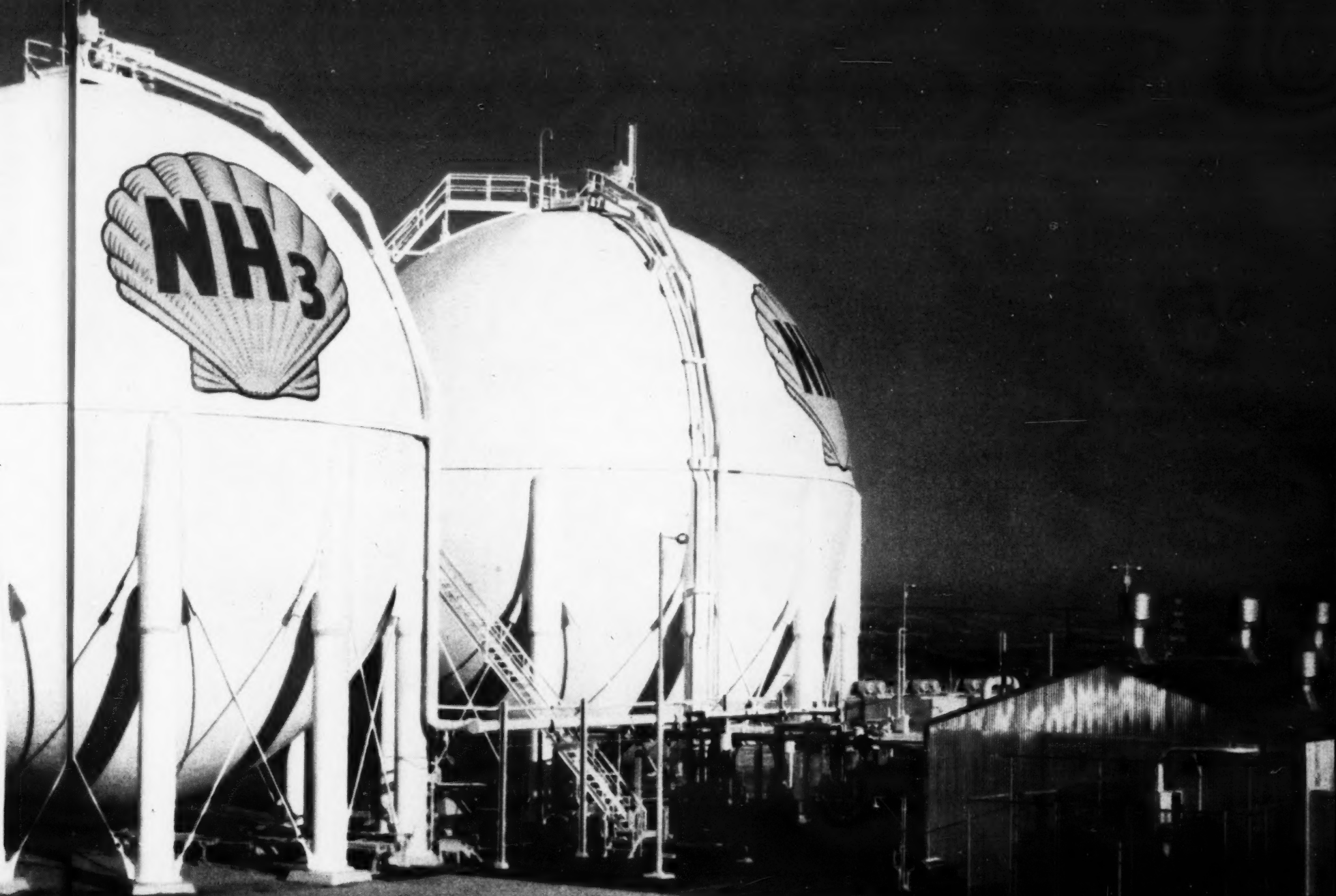


Increased volume caused a second plant to be built in Ventura to supply the Southern California area. Capacity released at Pittsburg was then available to produce ammonia for use in the Pacific Northwest — 700 to 1000 miles north.

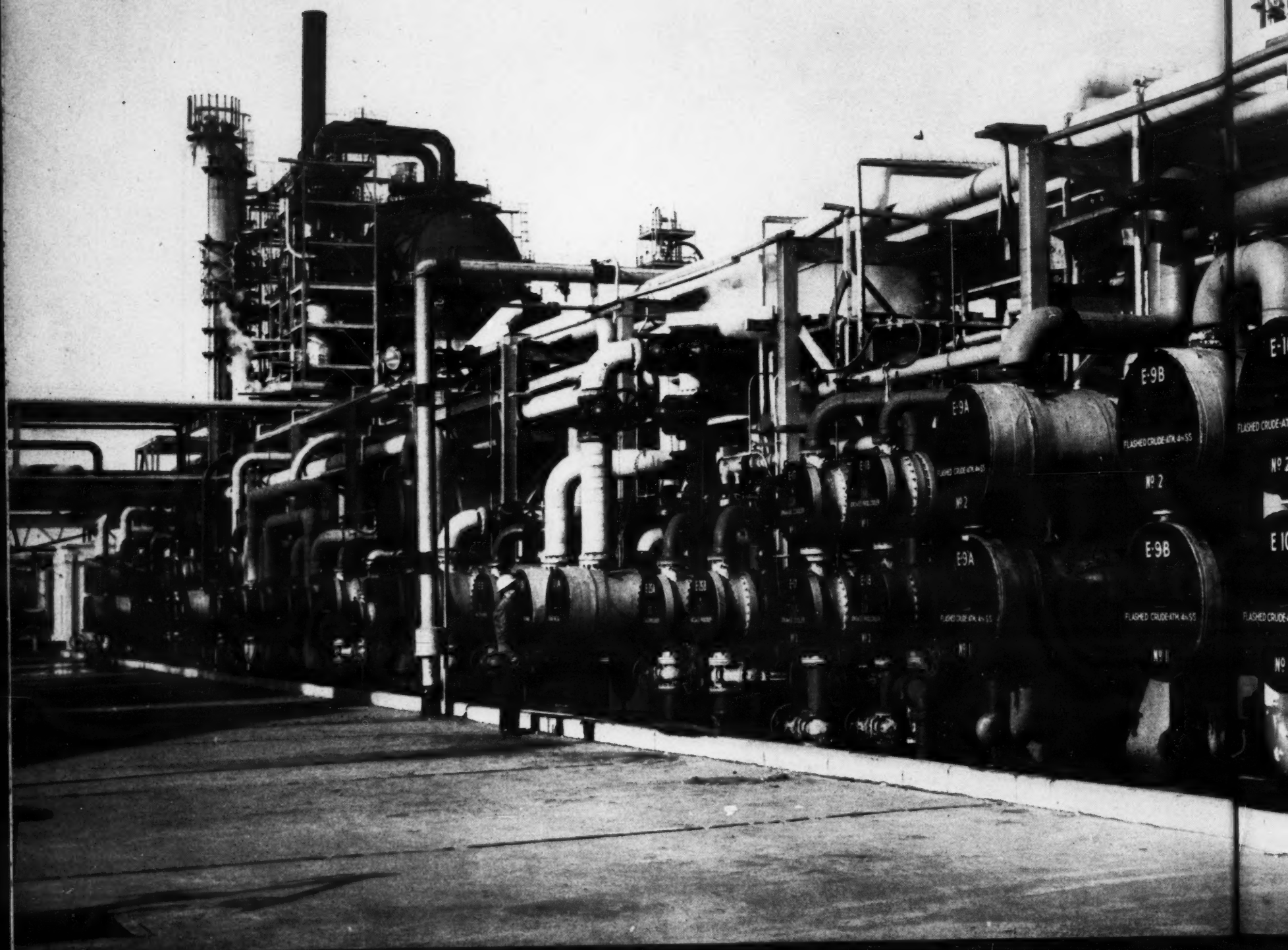
The services of the "Ammonia Mariner" are used to supply storage tanks located at Portland, Oregon. The sea-going barge is loaded at Pittsburg and towed to Portland by an ocean-going tug. The ammonia is unloaded there into storage, and re-shipped by river barge to Pasco, Washington.



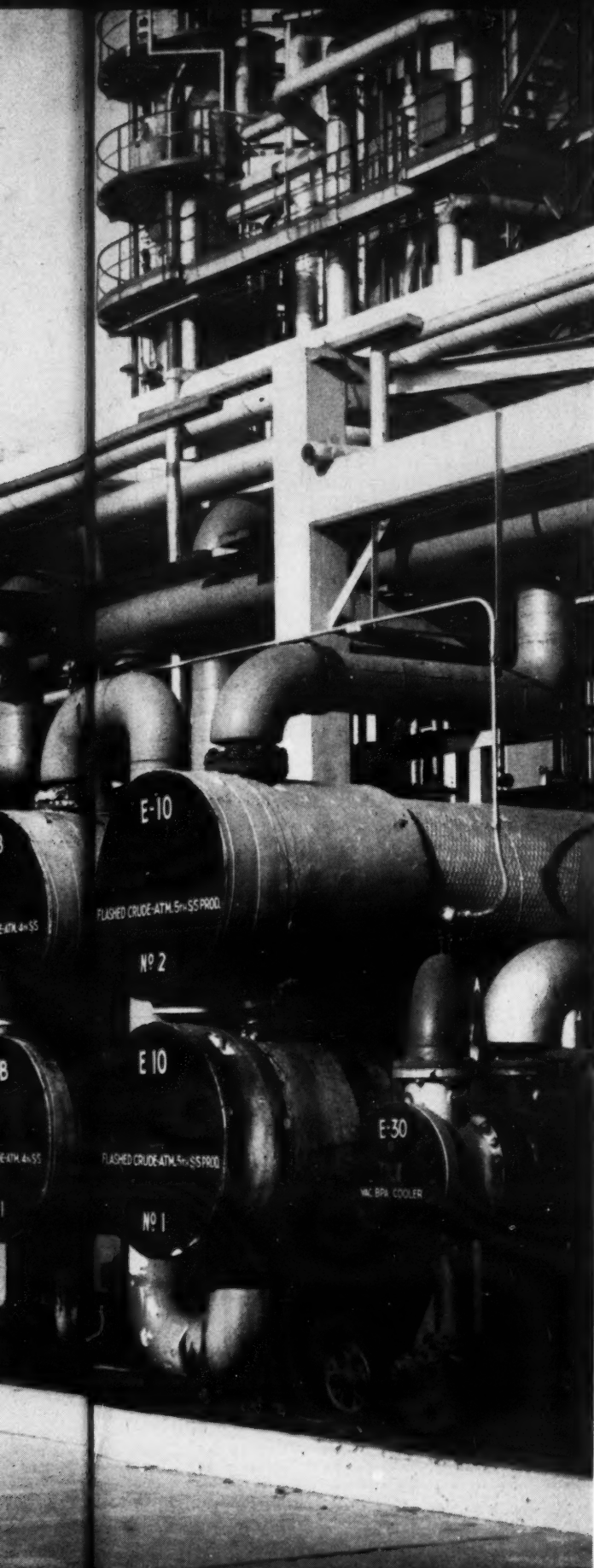




**new solutions  
of processing problems**







When used in Esso Bayway Refinery's newest pipestill, which processes 65,000 bbl of crude a day —

## COPPER ALLOYS COMBAT CORROSION

- Cupro-nickel is chosen for overhead condensers —
- Admiralty brass is found most economical for product coolers —
- While pure copper is most suitable for large quantity of instrument tubing used in unit —
- Just as Monel and stainless steel are used for tower internals



GORDON WEYERMULLER, Associate Editor

Copper — a metal which was used extensively by the ancient Egyptians — plays an important role, along with other metals and alloys, in battling corrosion at Esso's new pipestill at Linden, N. J. The unit, which went on stream in early 1955, handles 65,000 bbl of crude per day. Cupro-nickel, Admiralty brass, and pure copper used in the installation are still in excellent condition in spite of the combination of sulfur compounds and HCl, plus highly corrosive salt water that must be withstood in the pipestill.

Distillation in a pipestill is the first stage in refining of crude petroleum. This unit, which is designed to handle large quantities of material, separates the

crude oil into several fractions, including gasoline, kerosene, cracking stock, and fuel oil.

In the top section of the tower, where liquid water can condense, the principal corrosive agent is HCl evolved from magnesium chloride and other salts found in crude oil. This section is protected by the use of Monel bubble caps and trays. In the bottom section, where high-temperature sulfur corrosion must be guarded against, Type 410 stainless steel is used.

Just as other metals have been found most suitable for individual applications, copper and copper alloys have their place. After more than a dozen metals were tested for use in older units, six atmospheric tower overhead condensers on the new pipestill were tubed with cupro-nickel (69.6% Cu-30% Ni-0.4% Fe). This alloy resists the combined effects of H<sub>2</sub>S and HCl. The overhead vapors enter the con-

◀ Admiralty is most economical for product coolers when only traces of HCl are present

(Please turn to next page)





Standard Series S Chempump  
¾ horsepower  
90 ft. shut-off head  
50 gpm open flow capacity

## Substantial Price Reductions!

**Now...  
a seal-less Chempump  
that costs less than  
an ordinary  
centrifugal!**

Industry's widespread acceptance and resultant production economies make possible great reductions in the prices of Series S Chempumps. Prices on these leak-proof, low-maintenance pumps now start at \$325—less than the cost of conventional centrifugal pumps of similar delivery characteristics and standards of workmanship.

Like all Chempumps, Series S units combine pump and motor in a single hermeti-

cally sealed unit. No seals, no stuffing boxes. No problem of motor and pump alignment. Pumped fluids *can't* leak or be contaminated by outside matter. Bearings are constantly lubricated by the pumped fluid itself.

Write for complete details on low-cost Series S Chempumps. Send for Bulletin 1030. Chempump Corporation, 1300 East Mermaid Lane, Philadelphia 18, Pa. Engineering representatives in over 30 principal cities in the United States and Canada.

### NEW LOW PRICES of standard Series S Chempumps

With Class A insulation  
(for temperatures  
to 180F.)

With Class H insulation  
(for temperatures  
to 350F.)

Type 316 stainless steel	\$325	\$385
Carpenter 20 alloy	\$375	\$435

**Chempump**

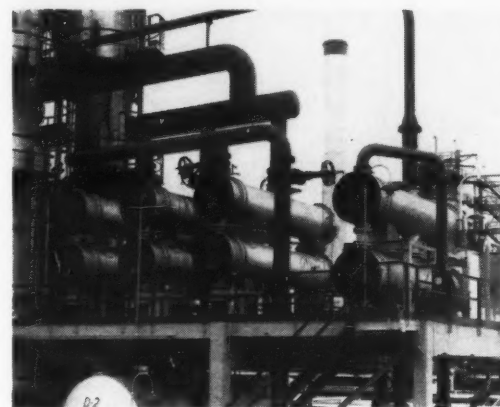
First in the field...process proved

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## NEW SOLUTIONS of processing problems

### Copper Alloys

(Continued from preceding page)



Cupro-nickel cuts corrosion losses in these overhead condensers

densers at 200°F and leave at 120°F. Salt water is used for cooling. Cupro-nickel is also used for two product coolers which handle the condensed light naphtha. Altogether cupro-nickel tubing with a surface of 16,280 sq ft is used in the unit.

After extensive testing of other metals, Admiralty brass (70% Cu-29% Zn-1% Sn, with an inhibitor added) was selected for the other 21 product and pumparound coolers. This alloy, not as expensive as cupro-nickel, is most economical for the less severe conditions where practically no HCl is present.

Some of these units cool gas oil which enters coolers at 350°-375°F and leaves at 130°-150°F. This gas oil serves as feed for the fluid catalytic cracking units. The gas oil has a fairly high sulfur content. Admiralty brass was used here because it was the most economical metal that would withstand the corrosive



Copper is extensively used for instrument tubing (as shown in this rear view of panelboard) because of its good corrosion resistance and mechanical properties

action of the salt water used for cooling, as well as the gas oils.

Two prefractionator overhead condensers are also tubed with Admiralty. These units handle light vapors which contain some sulfur and a small amount of HCl. Vapors enter at 200°F and leave at 100°F. Salt water is used for cooling.

Four other condensers on the vacuum side of the pipestill are also tubed with Admiralty. These condensers handle heavy fractions obtained from vacuum distillation. The product enters at 175°F and leaves at 95°F. Salt water is the coolant. The pipestill contains Admiralty tubing with a total surface of 97,000 sq ft.

Several thousand feet of copper instrument tubing is used throughout unit. Copper was chosen for this service because it has good resistance to oxidation and possesses excellent mechanical properties. It is malleable and ductile enough so it can be bent easily without flattening on bends. Another advantage of copper tubing is that it can be easily joined. The fact that the tubing is available in 1000 foot lengths is favorable.

(For more information contact Copper & Brass Research Association, Dept. CP, 420 Lexington Ave., New York 17, N. Y. . . . or check 1006 on form opposite last page.)



"Fenstrup, I want you to develop a paint that won't come off, and Dillworth . . . you work out something to remove it!"

Courtesy of "The Foreman's Letter"

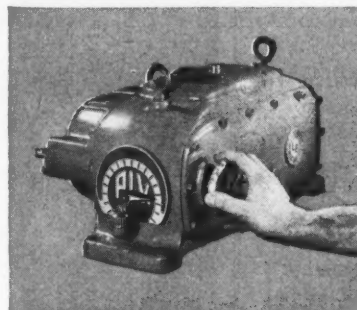
Because it uses a positive chain rather than frictional elements to transmit power...LINK-BELT P.I.V. delivers

## variable speeds with unvarying accuracy

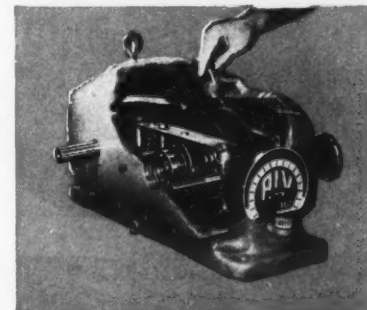
*Throughout industry, chain drives have long been preferred as a simple, versatile method of transmitting power positively and accurately. But it was not until the conception of Link-Belt P.I.V. that this advantage was adapted to variable speed drives. With its self-tooth-forming chain principle, P.I.V. provides instant selection of any speed between its maximum and minimum settings without stopping the machine.*



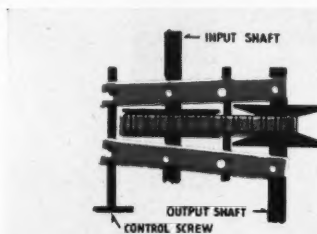
P.I.V. drives are built in capacities from ½ to 25 hp, in 8 sizes and 16 types. Compactness permits installation as a separate unit or built-in part of driven machine.



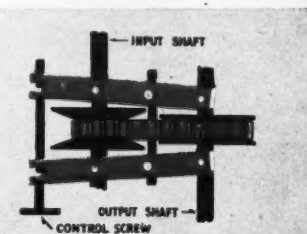
TO CHANGE OUTPUT RPM, operator merely turns convenient handwheel to selected speed, indicated by easy-to-read dial.



AUTOMATIC ADJUSTMENT of chain tension—by turning hand screw—assures accuracy during long life of drive.

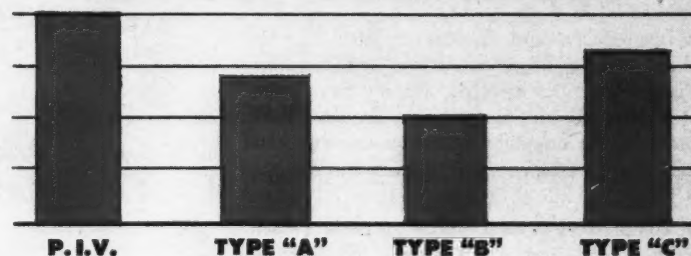


AT MAXIMUM SPEED SETTING . . . chain grips wheel grooves near perimeter of input side and near center of output side.



AT MINIMUM SPEED SETTING . . . relative position of chain to wheels is reversed, delivering low output shaft rpm.

### COMPARISON OF ACCURACY WITH P.I.V. AND 3 OTHER VARIABLE SPEED DRIVES



Using P.I.V. as a standard, bars indicate comparative ability to maintain desired rpm from no-load to full-load relative to three conventional variable speed drives. Chain principle of P.I.V. minimizes speed

drop—loss of accuracy which may affect product quality and uniformity. Operating independent of friction, P.I.V. provides instant, positive selection regardless of load or atmospheric conditions.

THE exclusive P.I.V. chain consists of a series of overlapping steel slats. These are free to move transversely from side to side, singly or collectively, serving as teeth. The chain meshes with radially grooved wheels, which are cut at a constant depth toward the wheel periphery. Beveled sides of the grooves offer gripping areas . . . provide a positive, non-slip contact at any speed, under all loads.

All-metal construction of P.I.V. is unaffected by atmospheric conditions. Housings are of close-grained gray iron—internal moving parts are automatically splash-lubricated.

You'll find much interesting and valuable information concerning P.I.V. in Book 2274. Link-Belt also

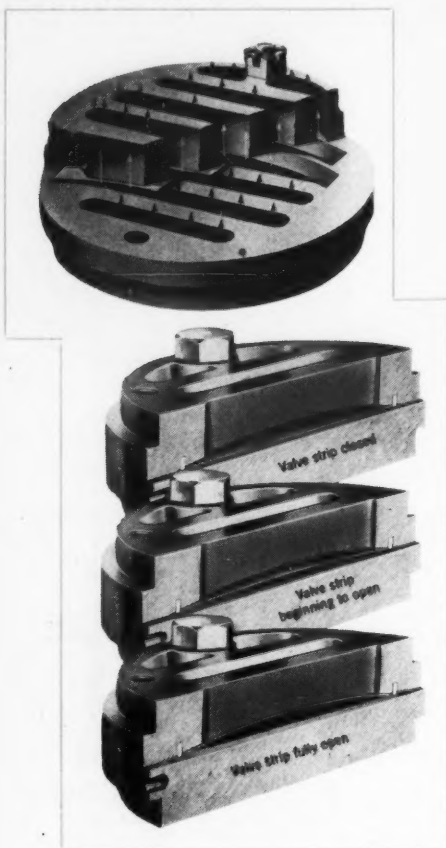
makes mechanical, hydraulic, electronic and pneumatic controls for regulating these drives automatically, and these are detailed in Book 2349. Ask your Link-Belt office.

LINK-BELT COMPANY: Executive offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14,154

When inquiring check 1007 opposite last page

## Vapor Pumps

(Continued from page 8)

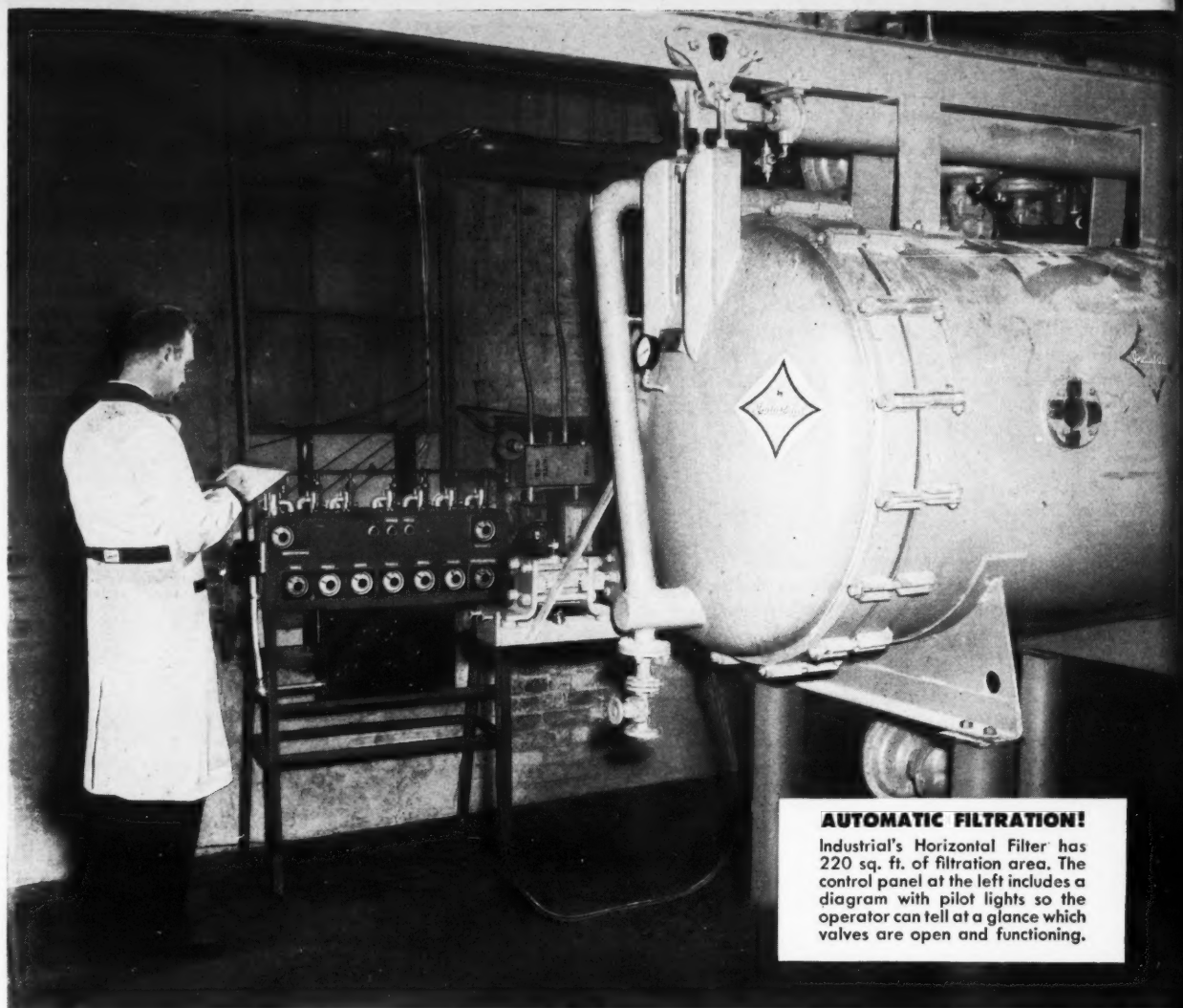


Valve action of valve used in ammonia compressors. Stainless steel strips control flow by opening at predetermined pressure

ammonia producers and distributors, Shell has applied the methods to control barge tank transfers. With larger quantities involved, methods have meant increased saving of shipping capacity for marketable product over the original application on tank cars.

Transfer method requires two ammonia compressors, as vapor pumps, at Shell's Pittsburg plant, seven similar compressors at each unloading point (Pasco, Washington, and Portland, Oregon), plus vertical deep-well type centrifugal pumps at each loading and unloading point. Two compressors of the seven at both Pasco and Portland are placed on automatic control to maintain storage temperature between barge shipments. Compressors at the Pittsburg plant are two 6 x 6" vertical two-cylinder, single-stage single-acting units driven by 40-hp, 1800-rpm motors. The seven compressors at both Portland and Pasco are similar units but larger, being 8 x 8" compressors with 75-hp motors.

Original loading of the barge is handled with deep-well centrifugal pumps. Compressors are used to reduce barge tank pressures by pumping out vapor



### AUTOMATIC FILTRATION!

Industrial's Horizontal Filter has 220 sq. ft. of filtration area. The control panel at the left includes a diagram with pilot lights so the operator can tell at a glance which valves are open and functioning.

## Different processes...different filters... all by Industrial

**Wide range of filter types and specific engineering  
delivers efficient filtration for any process.**

### Automation tunes filter to peak efficiency at all steps in operating cycle

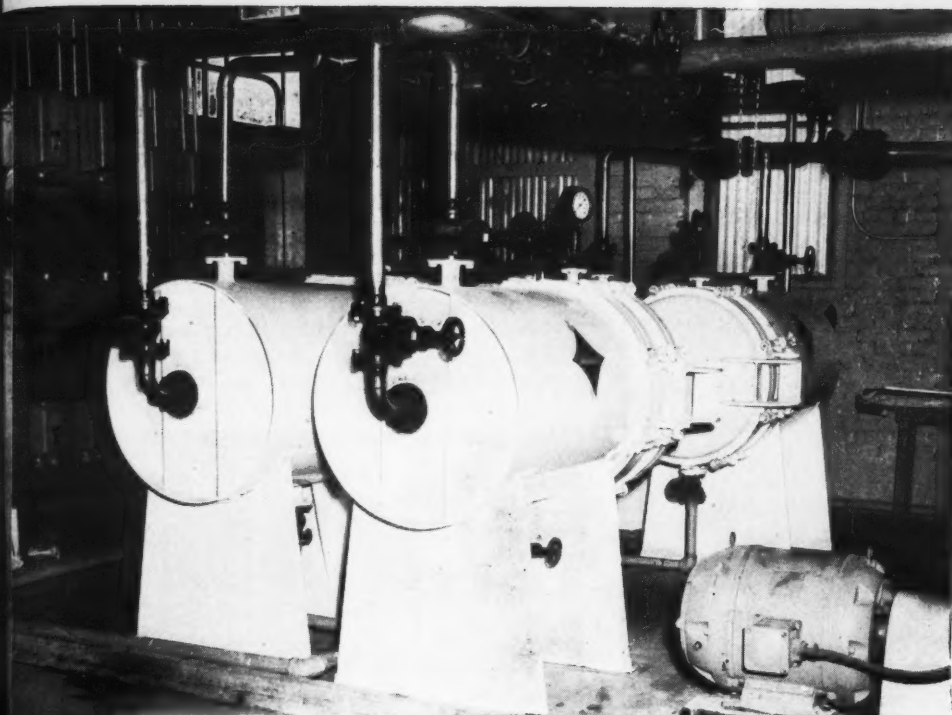
This Industrial filter is engineered to provide unusually complete control in filtering hot "thick" sugar liquor. The automatic controls can be set to carry out a complete cycle during which the filter fills, precoats, filters, drains, fills for shaking with a "thin" juice, shakes the filter cake off the leaves, drains off filter cake, sluices and starts to precoat again.

**Automation** All controls can be preset as desired to time each part of the cycle. The cleaning cycle can be started

either by a timer or by a switch activated by pressure on filter cake. Variations in cycle can be obtained by simply adjusting dials and all automatic controls can be cut out for semi-automatic operation by toggle switches.

**The process** This filter is used to clarify sugar liquor in the second process stage. Here the sugar fluid has already gone thru one filtering operation and has been reduced by evaporation. The fluid is hot (about 150° F) and its viscosity permits a flow rate around 13.5 gallons per square foot per hour or 3000 gallons per hour for the filter. The sugar will go thru several more evaporation and filtering operations before it is ready for use as syrup or made into crystals.





**Industrial's Tubular Filters.** Each has 72 sq. ft. of filtering area. This type is ideal for polishing and actually costs less than scavenger or auxiliary equipment on larger filters.

## Polishing sugar at 1¢ per 500 lbs.

**Tubular Filters** were recommended by Industrial's engineers for the final clarification of the sugar liquors because they can deliver the desired results at an extremely low cost and are an economical purchase. Operated two at a time, they process 27,000 lbs. in 15 minutes, and from 5 to 11 batches can be processed before cleaning. The low cost is due to the extremely convenient design. Filtrate flows from the inside to the outside of several perforated tubes in the chambers. Filtration is accomplished by filter papers inside the tubes. Cleaning is especially easy, the filter papers are simply taken out and replaced with clean papers.

**These sugar plant installations point up the reasons why Industrial is your best choice for any filtration job.**

- Industrial provides advanced engineering for specific applications.
- Industrial's standard units bring to your plant the fastest, most convenient and efficient filtration available today.

### SELECTION OF FILTER IS IMPORTANT

Here . . . Industrial offers you a vital service that assures you of the finest filtration system available. Industrial produces all types of filters . . . Horizontal, Vertical Leaf, Tubular, Hydra Shoc . . . and recommends, without partiality, a filter most suitable to your particular requirements. Industrial's accumulated engineering and manufacturing experience can be a great aid to economical processing. Many cost-saving optional features are available and almost all Industrial Filters are adaptable to complete automation. Intelligently selected, soundly engineered filters can pay for themselves in a surprisingly short time.

**Tubular**  
Bulletin  
No. TS-160

**Hydra-Shoc**  
Bulletin  
No. 114

**Horizontal**  
Bulletin  
No. NH-122

**Vertical**  
Bulletin  
No. 111

### WRITE FOR DETAILS

Reprints of "Automation," an article from Sugar Magazine about a typical sugar installation, are available as well as folders describing all Industrial Filters, Vertical, Horizontal, Tubular and Hydra-Shoc.

to facilitate loading, if necessary. Once the barge is loaded at Shell Point, the compressors are not used to refrigerate the barge for shipment. Liquid temperature in the barge tanks after loading seldom exceeds 50°F and temperature rise in transit is only a few degrees. (Normal maximum unloading conditions are 55°F liquid temperature and 100 psig vapor pressure.)

Upon arrival at unloading point, resident vapors from top of the storage tanks on land are drawn into vapor pump, compressed, and fed into barge tanks. Storage tank pressure is thus lowered and barge tank pressure increased. Liquid ammonia is forced into the storage tank by the pressure differential.

To remove remaining residual gases after the liquid transfer is complete, discharge vapors are cut off to the dock line and full discharge is directed through the condensers. The dock line is cut into the compressor suction line through a sphere pressure-controlled valve. The suction line remains open to the sphere. When vapor pressure falls to about 45 psig in barge tank, the vapor pump is stopped, having reduced the weight of residual vapors by about one half.

Efficiency and reliability of compressors are based on strip valves (called Feather Valves) to control flow in both suction and discharge. Suction valves are held in top of each piston. Discharge valves are in top of cylinder. Valve proper consists of very flexible strips of stainless steel which open and close valve ports with a gentle rolling action. Lack of impact, even with a 40-cps movement, gives longer life and negligible maintenance.

In opening, each valve strip flexes against the curved guard, permitting gas to pass on both sides of the strips and through ports in the guard.

**Results:** In the period of approximately two years since Shell began shipping ammonia by sea-going barge and using vapor pumps for unloading it, no essential changes have been made in the methods of handling.

Total turn-about time for unloading the 1700-ton barge is less than 24 hours using the vapor pump method. The 600-ton capacity barge has a turn-about time of less than eight hours when unloading at Pasco.

(Feather Valve compressors are product of Worthington Corporation, Dept. CP, Harrison, New Jersey . . . or for more information check 1009 on form opposite last page.)

# INDUSTRIAL

**FILTER & PUMP MFG. COMPANY**  
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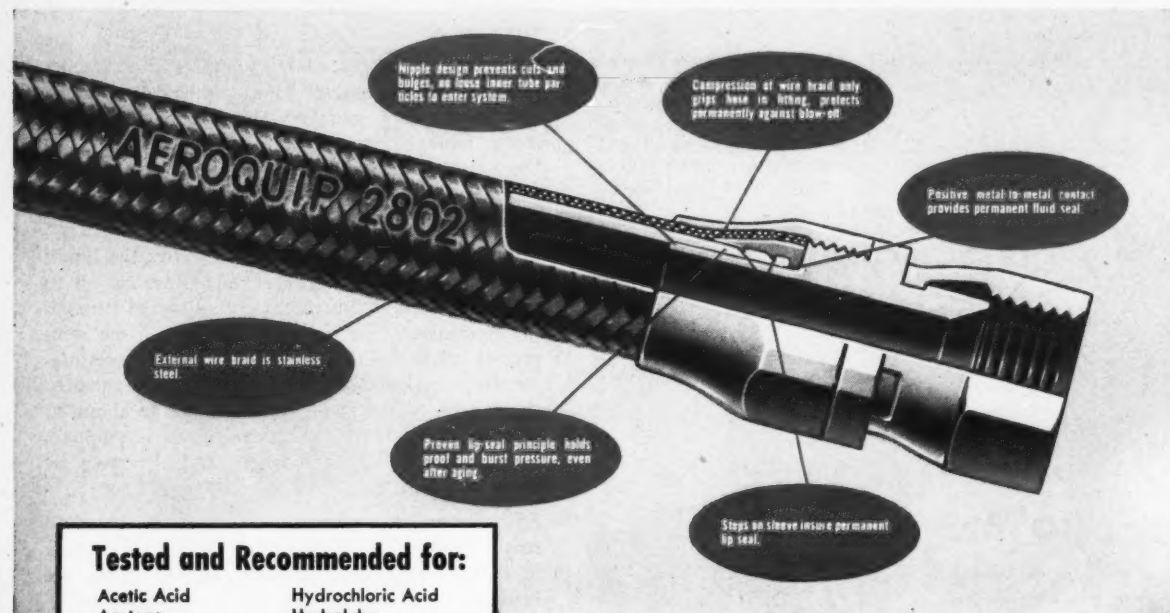
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JANUARY 1957

This month's Processing and Engineering  
Data Section starts on page 204

# Aeroquip Announces 2802 Teflon\* Hose with Reusable "super gem" Fittings

NOW YOU CAN ASSEMBLE TEFLON HOSE AND LEAKPROOF FITTINGS BY HAND!



## Tested and Recommended for:

Acetic Acid	Hydrochloric Acid
Acetone	Hydrolube
Air, Hot	Ketones
Alcohols, Aliphatic	Lacquers, Solvents
Ammonia, Aqueous	Lindol, Cellulose
Aqua Regia	Lube Oil, Hot
Asphalt	Mercury
Benzene (Benzol)	Naphtha
Carbolic Acid, Hot	Naphthalene
Chlorinated Solvents	Nitric Acid
Chlorine (wet or sol.)	Pydraul F-9
Creosote Oil	Steam
Ethers	Sulphur Dioxide
Furfural	Sulphuric Acid
Gasoline, Sour or Ref.	Trichlorethylene
Hydraulic Oil	Toluene (Toluol)
Hydrobromic Acid	Water, Fresh or Salt (hot or cold)

For temperatures from  $-65^{\circ}\text{F.}$  to  $+450^{\circ}\text{F.}$  Operation beyond these limits subject to Aeroquip approval.

New Aeroquip 2802 Industrial Teflon Hose and Reusable "super gem" Fittings make possible wide use of Teflon hose lines for fluid systems subject to extreme temperatures and corrosive fluids. No expensive swaging machines are required. To make Teflon hose lines, just attach the "super gem" Fittings to Aeroquip 2802 Hose using ordinary hand tools. It takes only minutes to assemble a factory-quality Teflon hose line right in your plant. "super gem" Fittings are economical because they can be detached and used again and again.

For full technical information on Aeroquip Teflon Hose and Reusable "super gem" Fittings, write for Bulletin IEB-26.



"super gem" is an Aeroquip Trademark. \*DuPont trade name for its Tetrafluoroethylene resin.

# Aeroquip

REG. TRADEMARK

AEROQUIP CORPORATION, JACKSON, MICHIGAN

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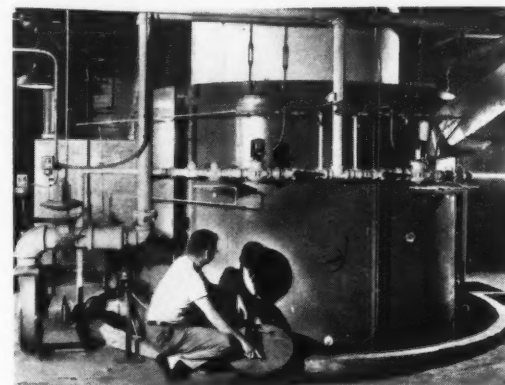
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NEW SOLUTIONS of processing problems

**Glidden boosts resin production and improves process control with radiant-fired kettle . . .**

heats and cools quickly, has low fuel consumption, and requires minimum maintenance

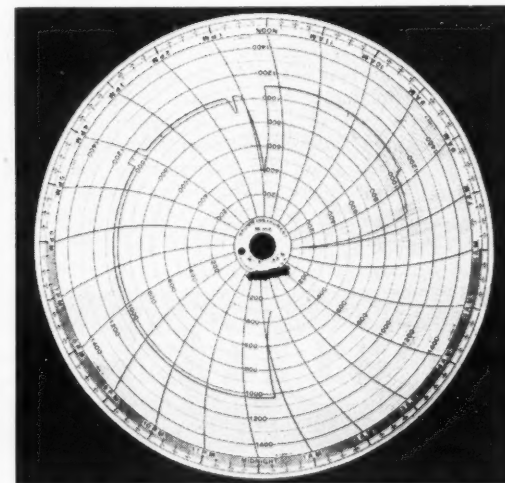
Production of synthetic resins and other paint vehicles has been doubled during a recent four-month period at the Reading, Pennsylvania plant of the Glidden Company, thanks to the installation of a radiant-fired furnace. Production of the



Engineer checks flame inside radiant heating furnace

new unit is about 60,000 gal per month. It takes only two and one-half hours to bring a 1000-gal batch up to  $475^{\circ}\text{F.}$  The furnace can come to full operating temperature from a cold start in less than 10 minutes. It will cool to "black" from the maximum operating temperature within 30 seconds after the gas supply is cut.

Furnace is constructed of a large chamber of light-gauge stainless steel surrounded by a high-tem-



Time and temperature chart of typical production batch shows quick rate of heat rise, sustained temperature control, and fast temperature drop achieved

CHEMICAL PROCESSING



perature, lightweight insulating material. Heated vessel is suspended in the furnace in such a manner that radiant heat absorption is very effective for the entire surface located within the furnace. Burners are mounted tangentially near base of furnace to produce a vortex of luminous flame.

In addition to the unit's ability to heat and cool rapidly, there are other advantages. Of particular value, according to Glidden, is the smooth and accurate temperature control which permits exceptional flexibility in production. Low initial cost, maintenance, and fuel consumption are other benefits realized with the equipment.

While a number of installations of the radiant-fired kettle have been made in process plants requiring close temperature control, the Glidden installation is the first where the product can be made by solvent dehydration as well as fusion cooking. The unit contains condenser and receiver system, thinning tank, scales, and instruments.

(Radiant heating furnaces are product of Chemical Plants Division, Blaw-Knox Company, Dept. CP, 300 Sixth Avenue, Pittsburgh, Pa. . . . or for more information check 1011 opposite last page.)

**Mixed acid fumes at 170°F  
not too tough for ducts  
made of plastic . . .**

previous ducts made from two different metals corroded in short time

**Problem:** Fume ducts made from a corrosion-resistant metal installed at a chemical plant in Niagara Falls in 1954 showed corrosion at the welds shortly after installation and gross failure within 60 days. Ducts made from another metal installed later corroded at the weld after a few months service and required extensive repairs. After 11 months, these ducts failed entirely. Ducts were handling mixed acid fumes at a temperature of 170°F.

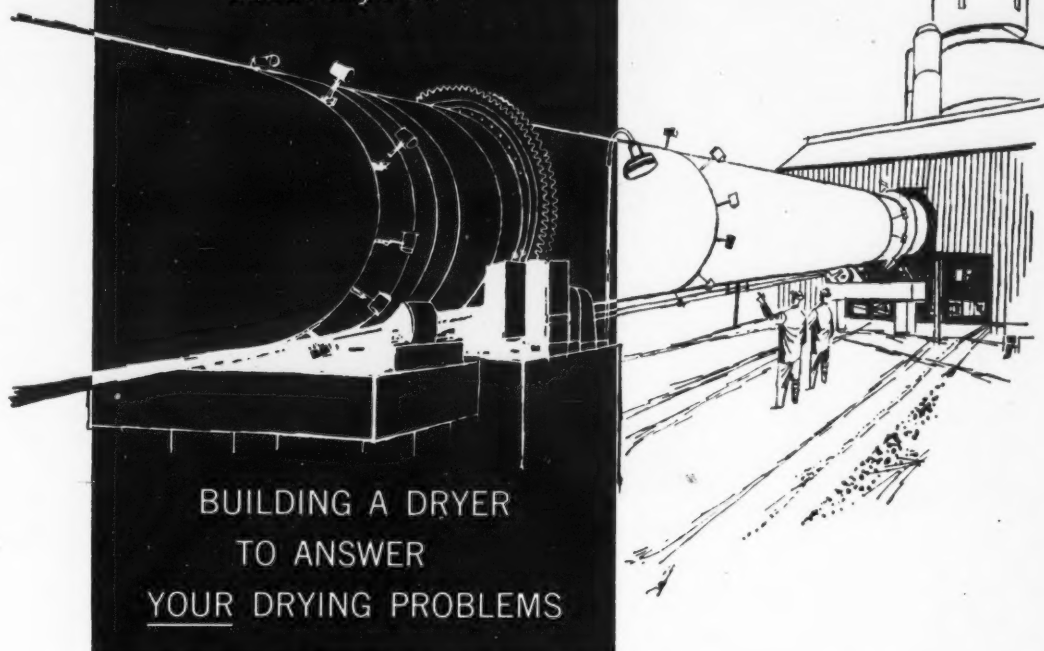
**Solution:** After conducting corrosion tests on a variety of materials, ducts made from glass fiber and polyester were placed in service. In addition to corrosion resistance, the plastic ducts were selected because of advantages in relative cost, resistance to elevated temperatures, and ease of installation.

**Results:** Plastic ducts have been in service for five months with no sign of deterioration.

(Fiberglass is product of Owens-Corning Fiberglass Corp., Dept. CP, 1833 Nicholas Bldg., Toledo, Ohio. Check 1012 opposite last page.)

(Plastic duct system was engineered by Du Verre, Inc., Dept. CP, PO Box 97, Hamburg, N. Y. . . . or for more information check 1013 on form opposite last page.)

facts you should know  
about dryers . . .



**BUILDING A DRYER  
TO ANSWER  
YOUR DRYING PROBLEMS**

For over 55 years, Louisville Dryers have been solving industry's drying problems and effecting marked economies. The following is intended as an introduction to selecting the right type of dryer.

**Q.** Since my required production capacity indicates a continuous dryer will give lowest drying cost, which design is best for my purpose?

**A.** Assuming the material is in bulk form, a rotary type dryer is best for your purpose. It is almost axiomatic that materials suited to drying in rotary dryers are dried at lowest overall cost in that type.

**Q.** If I consider a rotary dryer, should it use high temperature furnace gases or low temperature warm air to dry my material?

**A.** This will depend on your particular material, for instance—

1. The temperature to which it can be heated without injury.
2. The amount of moisture in the wet material.
3. The material temperature necessary to dry the material to the desired final moisture content.
4. Whether or not the material will be contaminated by contact with combustion gases.

**Q.** I think my material will not be injured by gases from an oil furnace. Should I use a parallel or counter current rotary dryer?

**A.** This will depend on a number of considerations, such as:—

1. Is the material flammable?
2. How dry must the product be?
3. Is the dried product dusty or is it granular with very small percentage of "fines?"
4. Will "case hardening" occur in high temperature atmosphere inhib-

iting uniform and complete drying of large lumps and particles?

**Q.** There seems to be quite a number of conditions affecting the selection of the proper dryer type.

**A.** Very true. And the conditions involved are not all included in the above discussion by any means.

**Q.** How can I be sure of making the proper choice?

**A.** An experienced drying engineer knows how to evaluate the various conditions involved in each drying problem and will make a sensible recommendation. If advisable he will also recommend pilot plant tests to confirm his conclusions.

**Q.** How can I obtain such advice?

**A.** Submit your problem to General American. An analysis and recommendation by a LOUISVILLE engineer entails no obligation on your part.



LOUISVILLE DRYING MACHINERY UNIT

**GENERAL AMERICAN TRANSPORTATION CORPORATION**

Dryer General Sales Office: 139 So. Fourth Street, Louisville 2, Kentucky

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In Canada: Canadian Locomotive Company, Ltd., Kingston, Ontario, Canada

General Offices: 135 S. La Salle Street, Chicago 90, Illinois

When inquiring check 1014 opposite last page



# TYGORUST—

**bonds vinyls and other finishes securely after minimum surface preparation**

Before the development of Tygorust it was frequently necessary to sandblast, scrape or chip rusted surfaces before priming could be started. Now, with Tygorust, it is only necessary to wire-brush loose rust and scale—and prime. The surface need not even be dry. Tygorust works equally well on damp or dry surfaces, penetrating through the rust to lock securely to the steel itself. It bonds tightly to clean or rusted steel and eliminates underfilm rust-creep—it goes over firmly adhering old paint (excepting bituminous coatings). It successfully primes damp or dry concrete—

in fact with its unusual properties it makes an ideal general purpose primer for plant-wide maintenance. It is easy to apply by brush or spray and provides economical coverage.

Tygorust is the perfect priming base for vinyl-based paints, making them as easy to use as ordinary paints. But Tygorust works equally well with all other types of finish coat too. However, for the ultimate in corrosion resistance topcoat Tygorust with Tygon Protective Paints. Tygon and Tygorust are a time-tested team that provide the maximum in plant-wide corrosion protection.

430E

TO HELP YOU COMBAT CORROSION...



Write for your free copy of The Tygon Paint Manual. Its 30 pages contain a wealth of helpful facts. Subjects include: Surface preparation; top coating for corrosive service; maintaining painted surfaces; solutions to common spray problems; and other subjects of equal interest.

Plastics and Synthetics Division



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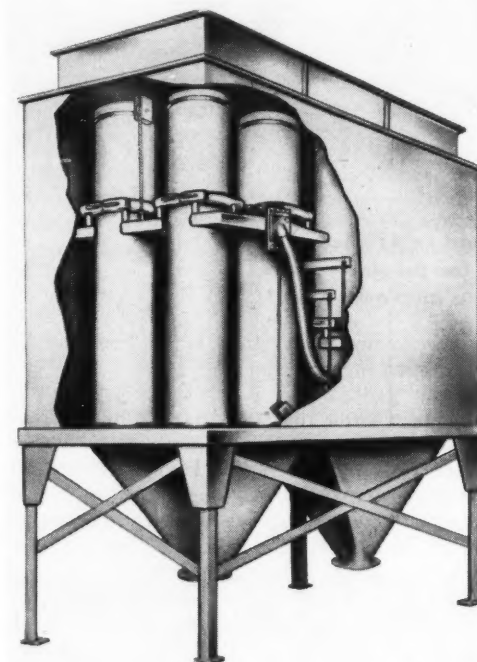
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NEW SOLUTIONS of processing problems

**Made from felts of "Orlon" —  
dust collector filter bags  
have more capacity . . .**

bags reduce draft pressure from eight to five inches water; operate through one inch range

**Problem:** Additional air-handling capacity was needed by Ehret Magnesia Manufacturing Company at Valley Forge, Pa., to keep up with dust collection demands of magnesia insulation plant. Draft pressure of eight inches water was required for necessary gas volume capacity to overcome rapid buildup from particles of magnesia insulation and asbestos fiber in process air. Relatively high pressure exerted on bags was causing excessive wear. Frequent bag repair and replacement were required.



Blow ring travels up and down dust collector bags, made from felt of "Orlon", to dislodge dust

**Solution:** Dust collector bags of wool felt were replaced with bags made from felts of Du Pont's "Orlon" acrylic fiber. After using wool bags for approximately two years, all 24 bags in the dust filter were replaced in 1954.

Dust collector uses the Hersey (patented) reverse-air-jet principle. Blow rings travel up and down

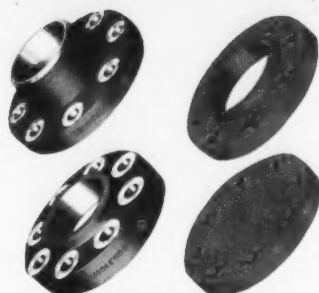
(Please turn to page 19)

For more information on product advertised at right, specify 1016 . . . see information request blank opposite last page. ➤





**BUTT WELDING FITTINGS  
(IPS)**



**ASA and MSS FLANGES**



**BUTT WELDING FITTINGS  
(TUBE O.D.)**



**LARGE O.D., TEMA and  
LONG WELDING NECK FLANGES**



**UNIONS**



**SCREWED and SOCKET FITTINGS**

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A broad, full-range line produced to unsurpassed standards of metallurgical and manufacturing integrity . . . plus adequate local stocks . . . gives you double assurance of satisfaction.

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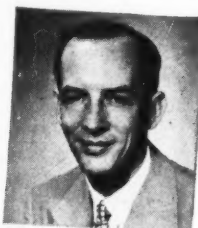
*A unique editorial philosophy guides  
Chemical Processing—*

- ... readability of content is fully as important as the editorial content itself. *Unless an article is read, it serves no one.*
- ... to build maximum readership, *of the busy men who manage*, editors must first take the work out of reading.
- ... articles must be terse, to-the-point, vital, pertinent to the *job-interests* of readers, adequate in information.
- ... headlines must *inform* quickly what each article is about... no vague or "tricky," misleading heads to waste readers' time.

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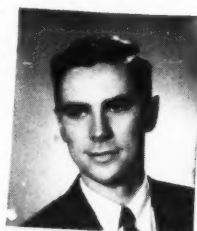
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**INDUSTRY POWER**

*"Executive Magazines For Industry"*



(Continued from page 18)

outside the filter. Air jets from blow rings dislodge dust from inside of filter.

**Result:** Use of felt bags of "Orlon" has increased air capacity from 14,500 to 18,000 cfm. Excess bag wear and breakage caused by higher air pressure and seepage have been eliminated since draft pressure has been reduced from eight to five inches water operating through resistance range of one inch. After two

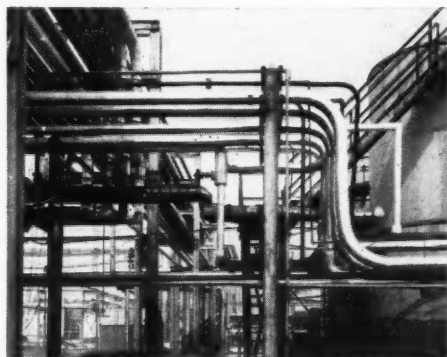


Interior of dust collector. Blow ring at right dislodges dust

years of constant operation, only occasional filter bag repairs are required.

("Orlon" Fiber, from which dust collector bags are made, is product of Textile Fibers Dept., E. I. du Pont de Nemours & Co., (Inc.), Dept. CP, Wilmington 98, Delaware . . . or for more information check 1017 on form opposite last page.)

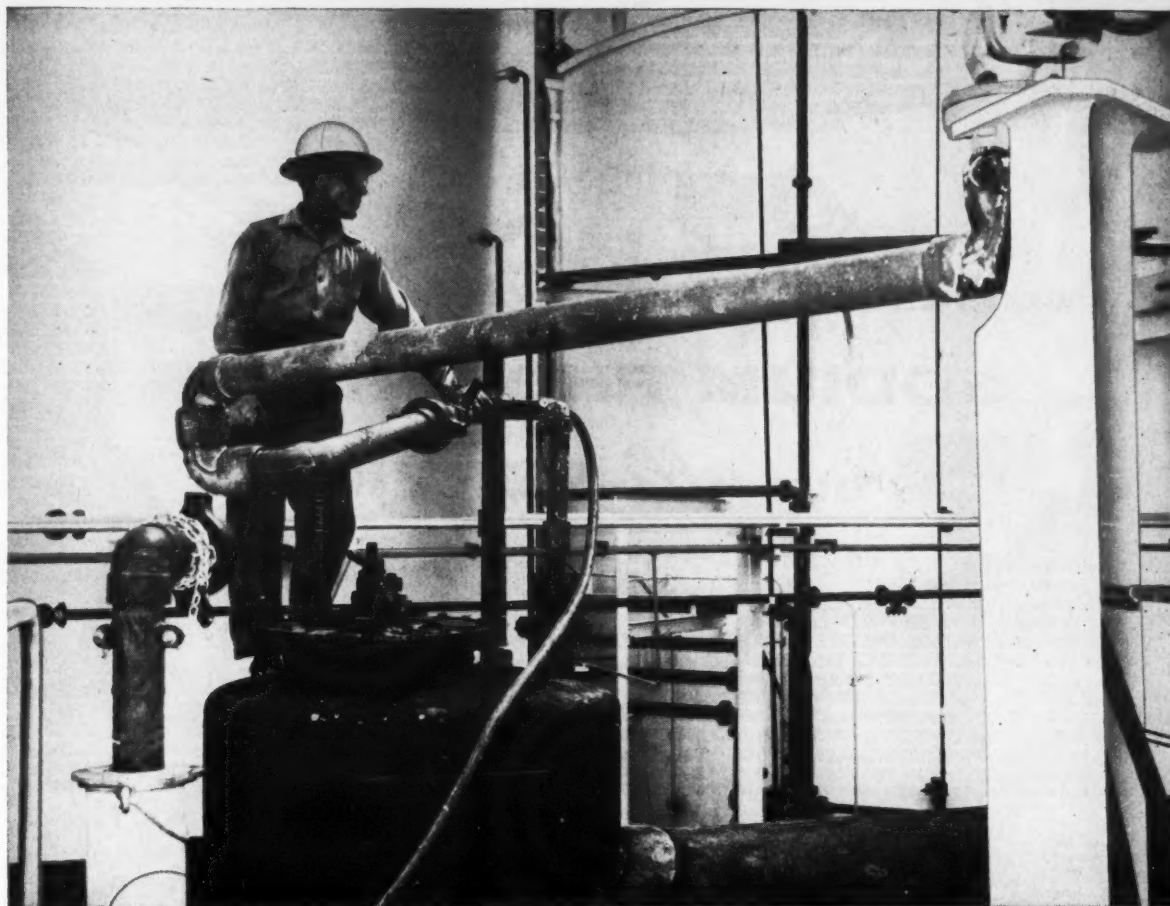
(Aeroturn Dust Collectors are product of Metal Products Division, Koppers Company, Inc., Dept. CP, P. O. Box 298, Scott & McHenry St., Baltimore 3, Md. Check 1018 on form opposite last page.)



#### Aluminum jacketing protects insulation

After more than a year of service, aluminum jacketing covering insulation on steam pipes at a large refinery on the East Coast is still standing up well. Jacketing protects the insulation from the weather and general refinery atmosphere. Another advantage is the favorable appearance.

(Al-jac aluminum jacketing is product of Aljon Mfg. Co., Dept. CP, 54-18 43rd St., Maspeth 78, N. Y. . . . or for more information check 1019 on form opposite last page.)

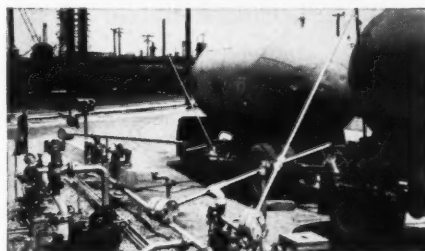


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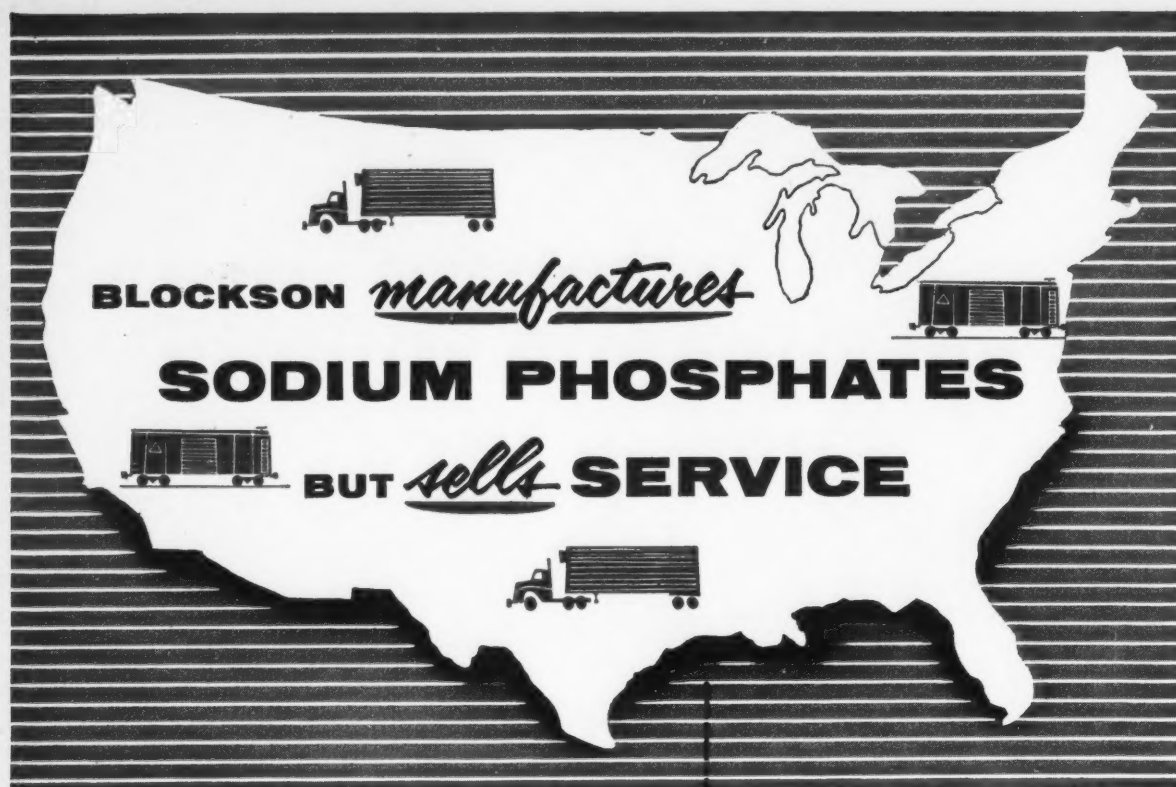
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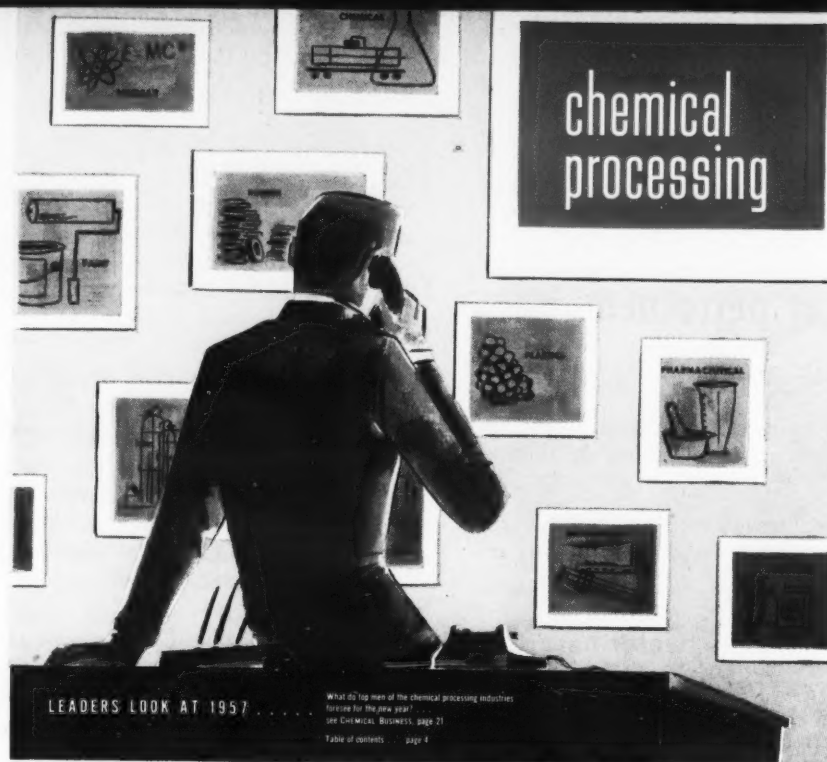
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**These nineteen leaders of the chemical processing industries tell what they foresee for their fields in the coming year**

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**CHEMICAL PROCESSING**





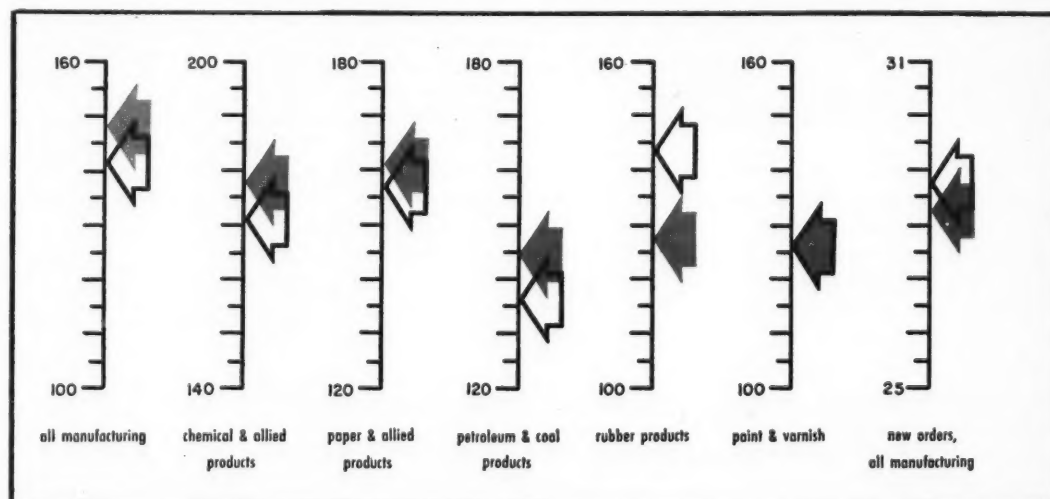
Trends in the chemical world . . .  
 what they mean to you . . .  
 as reported by the editors  
 of CHEMICAL PROCESSING

## Chemical Industry Leaders Talk About 1957...Page 24

### chemical business INDEX

Production indices (first six scales) are based on the index, 1947-49 = 100. New orders (last scale) are given in billions of dollars.

latest month  
 corresponding month,  
 last year



## 'Butadiene to rival ethylene as petrochem building block': Petro-Tex

With the major stumbling-block — government dominance in synthetic rubber — out of the way, activity in butadiene-based chemicals is beginning to move forward pretty quickly.

Previously, uncertainties about the fate of several government synthetic rubber holdings kept the butadiene market picture hazy. And without reasonably accurate market information, chemical makers held back on building new butadiene facilities . . . the resulting lack of the material held research to a minimum.

Now that things are clearing up somewhat, tonnage quantities of the material will soon be available. Latest to announce plans for expansion of butadiene production is Petro-Tex Chemical, jointly owned by Food Machinery and Tennessee Gas Transmission. Scheduled for January: 50,000 tons annually to be added to current production of 90,000 tons.



According to Petro-Tex Research Director **Dr. Marshall Welch**, butadiene may soon rival ethylene as a starting point for plastics and other petrochemicals. And company spokesmen suggest that other light hydrocarbons — e.g., ethane, propane — may soon come under pretty close scrutiny.

Company's original process was based on cracking butylene. New operation uses process based on cracking butane.

### Make quality water-based exterior paints—at low cost

Puzzler: How to make a "water paint" that dries so rapidly that a sudden shower, blowing up 15-or-so minutes after application, won't phase it? And in addition, the coating must be durable, have low dirt retention, and be low in cost.

One answer, just announced at the Paint Industries Show in Cincinnati, is to use Monsanto's Lytron 680, a modified acrylic-type latex.

Cost savings accrue from copolymer's high pigment-binding capacity: a little bit goes a long way. Data and formulation details are on page 78.

### Victor's already negotiating

. . . for large industrial site in Chicago. Plans involve a phosphoric acid plant for foods, metals, petroleum products, and liquid plant foods. Sales region for plant output is expected to be Illinois, Indiana, Wisconsin, and Michigan. Once acid plant is completed, phosphate salts plant is contemplated for detergent and milling industries.

Plant design will be similar to one already in operation at Morrisville, Pa. — a large tonnage production unit with advanced instrumentation and control.

### First-born for Amoco Chemicals

First plant for newly organized Amoco Chemicals Company (formed from three Standard Oil subsidiaries) will be based on xylene oxidation process. Products will be 60 million pounds annually of terephthalic acid, isophthalic acid, phthalic anhydride, dimethyl terephthalate, dimethyl isophthalate, and benzoic acid.

Big step of Amoco means that Standard (Indiana) is going into chemicals in a big way and intends to make the big four (Shell, Phillips, Standard of N. J., and Standard of California) the big five.

Interesting angle is that the new plant will not be making ethylene-derived aliphatics but large group of relatively complex aromatics. Feature of process

is that xylenes from petroleum are oxidized with air — cheap, and yields are high. Another feature of process is flexibility. Many different chemicals can be made from one raw material and different xylenes can be used



O'Connell

for raw materials. Standard acquired process from Scientific Design Company of New York.

Plant cost will be "in excess of \$10 million". Location will be Chicago area with Whiting refinery as one source of raw material. Construction plans call for ground-breaking early in 1957, operation in 1958.

Organization of Amoco reflects strong desire of Standard (Indiana) to be more aggressive in petrochemicals



field. Three subsidiaries consolidated in new organization are Indoil, Pan American, and a former Amoco Chemicals located in Tulsa, Oklahoma. **J. H. Forrester**, president of Amoco, is locating operations in Chicago. Marketing vice-president is **John J. O'Connell**, from Shell Chemical in New York City. Indoil's **Dr. George Harrington** is general manager of development. **Howard Peterson**, also of Indoil, is manager of special products.

Production vice-president for Amoco, in charge of the new plant, will be Standard "old hand" — **Dr. John Bertetti** from Pan-Am Southern Corp.

One of chemicals to be made is terephthalic acid, basic for Dacron. Market gossip is that twice US supply of this acid could be used today if it were available.

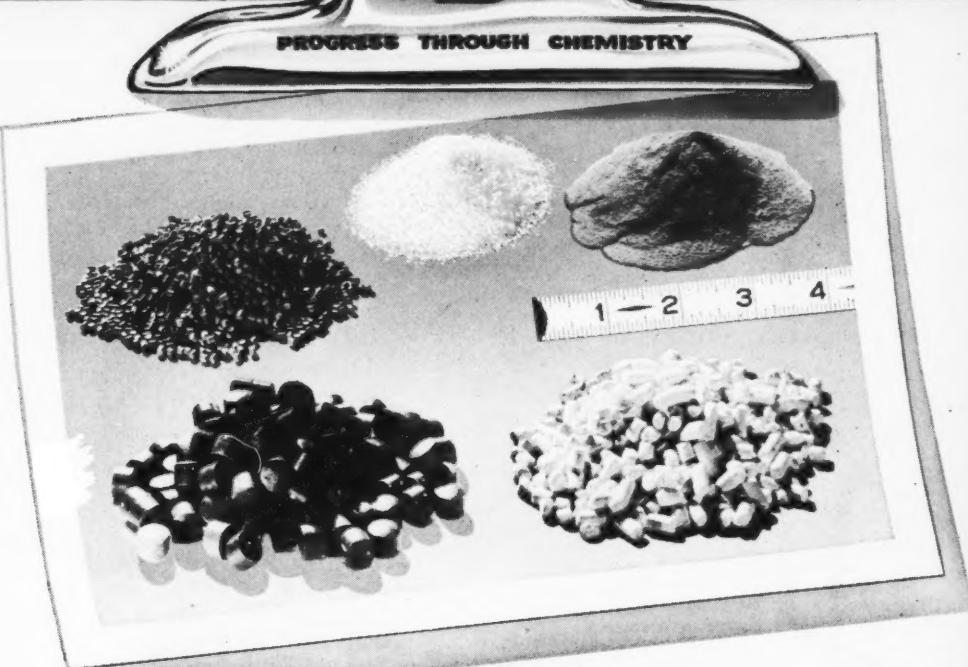
Move of Standard reflects economics of petrochemicals and crude liquid hydrocarbons. By conversion to gasoline, less than one cent per pound is added to original value of crude. Conversely, average price of petrochemical products upgrades average return between 10 and 15 cents per pound.

#### Dreaming of consumer markets?

Every day, possible diversification into consumer marketing fields is becoming more interesting to chemical marketing managers. Dow, with its Saran Wrap, has already made the plunge — and taken its lumps — but found out what it takes to do the necessary marketing job.

**Parker Frisselle**, manager of Dow's market research department, told of Dow's adventures before a recent MCA meeting. A chemical marketing team lined up and set out to place a roll of Saran Wrap in every household in the land. One comment has been made that the marketing group had the advantage of not knowing why they couldn't succeed . . . so they did.

MCA and Chemical Business have made copies of the talk available. For yours, check 1022 on form opposite last page.



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What makes one catalyst superior to another? Often it is the unseen ingredient, "know-how". Davison's long experience in successful catalyst production gives you this all-important element.

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65% Mn SO<sub>4</sub>. Designed specifically for inclusion in mixed fertilizer.

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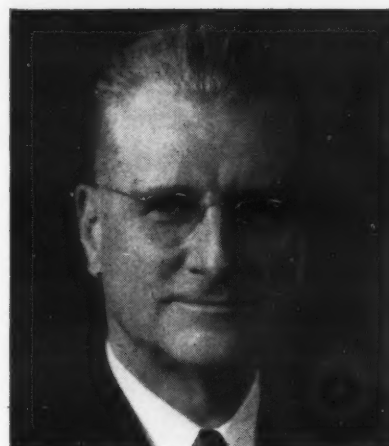
PHARMACEUTICAL

The Leaders Speak

DR. E. H. VOLWILER

President

Abbott Laboratories



## Data processing and instrumentation paces modern drug production

Characterized as it is by constant pressure on the selling prices of its products, the drug industry today depends to an ever-increasing degree on improved technology to hold the line on research, manufacturing and selling costs.

Because of the rapid obsolescence of old pharmaceutical specialties and the steady stream of new products, the drug industry has found it necessary to re-evaluate and sometimes completely revamp its technologies.

In 1957, as our increasingly competitive industry appraises its technology, two closely-linked technical developments appear to have the greatest significance. The first is the use of electronic data processing equipment for the control of mechanical or chemical processes and for research evaluation. The second is the wider application of superior instrumentation to increase efficiency in the research laboratory.

In a very few years our industry advanced from hand operations to mechanical operations. Now we are in position to apply the techniques of controlled mechanization. Symbolic of this progress is the advance from the mortar and pestle to the continuous ball mill. From the ball mill we move to the micro-pulverizer.

The coming year certainly will see more and more intensive analyses of products to determine whether the products justify substantial investments in equipment and whether the processes are sufficiently long-lived to warrant automation.

A variety of plant operations are already on a continuous basis in a number of companies. In several plants, for example, tableting is continuous from mixing to final packaging. Considerable progress is being made in the use of continuous tube autoclaves for chemical synthesis and, to an increasing extent, the principles of engineering are being applied to fermentation to achieve continuous processes.

In manufacturing, more and more instruments are being used for continuous monitoring of reactions. In inventory control, in production planning and in the analysis of vital statistics, electronic data processing equipment is becoming an increasingly important factor. Some firms have found that, with this technology, it is now economically feasible to develop operating and sales data more frequently, more quickly and in more useful form.

While digital computers and control instrumentation are perhaps the most dramatic factor in the picture for 1957, other developments are also extremely significant. The use of high-energy radiation has been initiated for the sterilization of products which do not lend themselves to conventional methods. Another development of importance is the application of tissue culture to the mass production of complex pharmaceuticals such as vaccines.

So much for the principal factors which would appear to affect manufacturing. Now let's consider some developments in research technology which would seem to be of greatest significance this year.

In research, as in manufacturing, the biggest technological factor is the increased use of instrumenta-



tion to provide data and increase the number of assay procedures which can be performed in a working day. Electronic stored data processing equipment is being used to classify compounds and codify research data.

In analytical circles, scientists are pointing to vapor phase chromatography as perhaps the greatest development in the past decade. It is to be expected that the gas chromatography devices will supplement the mass spectrometer in laboratory work. Although the instruments used for this procedure are now used only as analytical tools, steps are being taken to produce equipment suitable for plant use as a monitoring tool.

Another research technique which will probably find broader plant use during 1957 is that of preparative electrophoresis using stabilized media such as paper and starch. With the aid of this fractionating procedure, separations which previously could only be done in the laboratory will now be possible with plant-scale equipment.

Because of the increasing availability of highly-precise instruments, the chemist no longer needs to rely entirely upon chemical reactions to gain an insight into molecular structure. From the ultraviolet and infrared spectrophotometers he is able to determine the presence of certain functional groups and specific groupings. Chemical reactions can then be used to confirm this evidence.

X-ray diffraction techniques have gone even further and have led to the complete clarification of such complicated molecules as vitamin B-12.

Developments in the field of spectrophotometry are especially significant. Ultraviolet spectrophotometry is now common-place. Infrared spectrophotometry, which is not as universally available as yet, has many more advantages because the maxima throughout the infrared range are sharper and better defined. Infrared ranks on top of the list in regard to specificity and also has the advantage of quantitative application.

Fluorometry, which has been used for years for the determination of such compounds as riboflavin, thiamine and quinine, has now come to the fore with the development of commercial spectrophotofluorometers. A surprisingly large number of compounds can now be studied by this means which offers a very sensitive qualitative and quantitative approach. It is a very useful tool for more detailed investigation of fluorescent characteristics of naturally-occurring biological constituents and at sub-microgram levels.

Use of radioactive materials in clinical evaluation of drugs promises to greatly broaden the horizons of our work. Already radioactive cobalt is being used extensively to study intrinsic factor in the treatment of pernicious anemia. Other radioactive materials will assume increasing importance in determining the safety and metabolism of experimental drugs.



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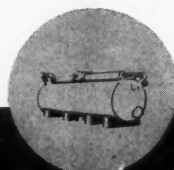
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**new**

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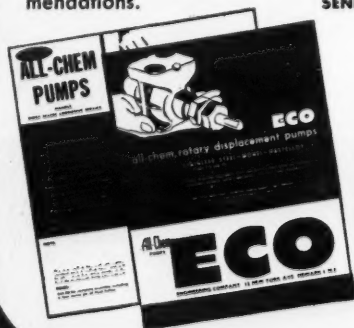
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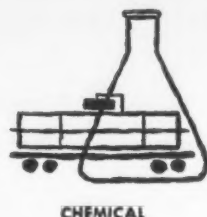
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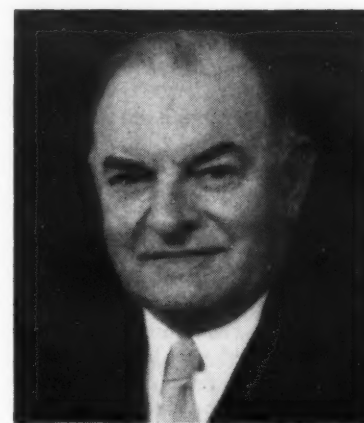


*The Leaders Speak*

## Coming year encouraging for chemical industry

FRED J. EMMERICH

President  
Allied Chemical & Dye Corporation



An appraisal of factors or trends in business likely to have the greatest effect on the chemical industry can be expressed in a broad sense by a comparison of the general economic climate in 1956 with that which may be expected to prevail during 1957. The close relationship between the vigor of the chemical industry and economic well-being of the country as a whole has its basis in the fact that chemicals play so vital a role in practically every major field of activity of American industry and agriculture.

Production, employment, incomes, and spending reached new highs and made 1956 a record business year. The net overall gain, however, was the result of a combination of rises and declines in important areas. Industry's outlay for plant and equipment increased sharply and provided a major stimulus to business. Government expenditures rose moderately.

### *Cross-currents Reflected*

On the other hand, consumers reduced their spending on durable goods, although they continued to expand their purchases of nondurable goods and services. These cross-currents in expenditures were reflected in industrial activity. Among industries that experienced contraction in production, automobiles and residential building declined the most.

As for the chemical industry, the market for its products as a whole was larger than in 1955, despite slow-downs in certain industries and some adverse conditions resulting from the steel and other strikes.

At the end of 1956, general business activity was proceeding at high levels and

numerous signs of continuing strength in various sectors suggest another good year in 1957. However, after more than two years of expansion and with conflicting trends still in evidence, it is somewhat doubtful that the gains will be of a spectacular order.

The chemical industry anticipates continued strong demand for its products in 1957 on the basis of a high-level industrial activity, and may continue to outpace industry generally.

It has the advantage of highly diversified composition of output, steady flow of new products, and rapidly advancing technology springing from intensified research. The industry's large capital expansion programs have permitted improved methods of manufacture and increased volume of business.

The chemical industry cannot help but benefit from prevailing high levels of automobile production, residential building and road building. The automobile industry uses synthetic fibers, plastics, paints, glass, insulation, special alloys and chrome coatings. Manufacturers of automobile fuels and lubricants are also im-



portant users of chemical products. Home building uses products of the plastics industry and other chemicals, not only in house construction itself but also in the manufacture of furniture and household fixtures.

Another important factor in the chemical industry's outlook is the Federal road-building program. Each mile of new highway construction will require substantial quantities of explosives, paints, silicones and other chemical products; even chemical weed-killers and fertilizers figure in the highway program.

Also to be taken into account is the increasing importance to the chemical industry of the development of nuclear power for peaceful uses. While its full impact will not be felt in the immediate future, the sale of chemical products for processing of nuclear fuels is developing into a business of large proportions. The chemical industry is looking to develop economic uses for radioactive waste products which must now be buried or dumped far at sea. Unlocking the secret of utilization of this material has become a challenge.

#### Still There Are Problems

While the outlook for the chemical industry is generally encouraging, there are other factors which must be considered in any balanced appraisal of our chemical business. The very facilities added by the industry in anticipation of increased markets may, over the short-term, present some problems in market development and perhaps make for overcapacity for some products. However, growing demand from increases in population and improvements in the standard of living should correct this condition in time.

Other problems to be faced by the industry are those of mounting operating expenses and weakened tariff protection. Higher labor, transportation, and other costs continue to exert unremitting pressure on profit margins, and necessitated some upward price adjustments last year. The industry is exerting unrelenting efforts to cut down costs of manufacture, increase its productivity, and expand its markets.

The chemical industry, which provides strong support to other segments of the economy, and in recent decades has opened up new avenues to progress, may be relied upon to make the most of the many opportunities which 1957 will bring.

#### Snow and ice removal

... for winter road maintenance is requiring more and more calcium chloride in flaked form. To help meet increasing requirements, Columbia-Southern is bringing a new plant on stream at Barberton, Ohio, to produce regular flake  $\text{CaCl}_2$  and also liquid solution forms.



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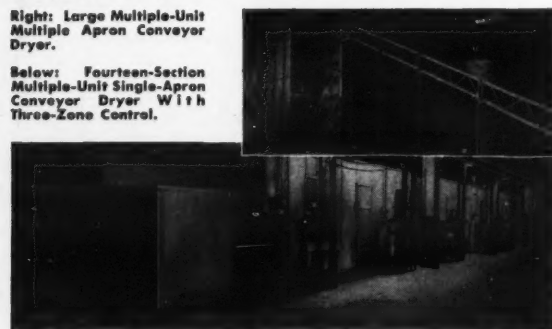
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Right: Large Multiple-Unit Multiple Apron Conveyor Dryer.

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The Leaders Speak

WILLIAM E. MCGUIRK JR.

President

Davison Chemical Company



## Five points influence fertilizer picture in 1957

These are the five big factors which can be expected to greatly influence fertilizer production this year:

- Increased nitrogen fixation capacity.
- Increased use of liquid fertilizers.
- Increased production of granulated solid fertilizers.
- Increased production of higher analysis fertilizers of all kinds.
- Growing appreciation of the importance of degree of solubility and time of application of fertilizers.

### Nitrogen Capacity

This year, we will see the culmination of a tremendous increase in nitrogen fixation capacity which has been in progress for the past several years. At the end of World War II there were 18 synthetic ammonia plants in the United States with a total annual capacity of about 1,240,000 tons of fixed nitrogen. By the end of 1957 it appears that there will be 55 synthetic ammonia plants with a total capacity of about 4,100,000 tons of fixed nitrogen per year. In addition, other sources of fixed nitrogen will swell the total US supply to about 4,250,000 tons, after allowance for exports, imports, and conversion losses.

The total consumption of nitrogen for fertilizer use, which has been increasing steadily, was 1,960,536 tons in 1954-55 and is expected to be about 2,300,000 tons in 1956-57. Industrial and other users will take perhaps 1,500,000 tons.

The availability of these large quantities of ammonia is having and will continue to have significant effects on the fertilizer industry. The use of ammonium nitrate, both in solid form and in aqueous solution for both direct application and manufacture of mixed fertilizers, has been increasing and will continue to increase. The use of anhydrous ammonia for direct application into the soil has grown spectacularly in the last few years but appears to be leveling off.

Direct application of aqueous solutions of ammonia with or without other nitrogen compounds is growing faster than any other use of nitrogen. Use of urea for direct application as solids or solutions and in manufacture of mixed fertilizers is growing. Urea solutions are widely used for foliar application to crops and orchards.

The percentage of nitrogen applied directly varies widely by regions of the United States, from 14.4 percent in the New England states and 17.8 percent in the Middle Atlantic states, to 88.4 percent in the Pacific states and 92 percent in the Mountain states.

In 1954-55, 59 percent of the nitrogen used for fertilizers was applied to the soil directly, instead of through the mixed fertilizer route, and this percentage is growing steadily. It was only seven years ago that more nitrogen was used in mixed fertilizers than for direct application. This trend is expected to have two important effects: (1) an increase in the proportion of nitrogen used as compared with phosphates and potash, the

other two major plant foods, and (2) a change in the pattern of distribution of phosphate and potash fertilizers.

Five years ago the ratio of N to  $P_2O_5$  to  $K_2O$ , applied in all fertilizers, was approximately 1:2:1; the present ratio is approximately 1:1:1. Since nitrogen cannot be used exclusively without phosphate and potash, the great increase in direct application nitrogen means that phosphate and potash must be supplied separately. It is expected, therefore, that there will be an increased demand for direct application phosphate and potash fertilizers, and mixed fertilizers containing only phosphate and potash.

It is clear that these changing patterns in use and distribution will not adversely affect the total of phosphate and potash applied as fertilizers. When application of fertilizers is far below recommended quantities of all three ingredients, promise of consistent growth for phosphate and potash as well as for nitrogen is assured.

#### Liquid Fertilizer

In addition to the nitrogen solutions, interest in complete liquid fertilizers appears to be growing. Manufacture of these materials depends on availability of phosphoric acid at prices competitive with other phosphate materials. At present most liquid fertilizers are made from electric furnace phosphoric acid, which is expensive and limited in supply. Research is being directed toward manufacture of complete liquid fertilizers from wet process phosphoric acid, which is less expensive but also less pure. If this can be accomplished, the manufacture of liquid fertilizers should increase considerably. It appears, however, that such fertilizers will be a minor part of the total production, because even wet process phosphoric acid is not produced in sufficient quantity to take over a major part of the market.

The advantages of liquid fertilizers to the formulator include lower processing and handling costs and smaller inventory of finished products. The advantages to the farmer are the application of all nutrients at the same time, accurate application rate control and ease of application at the time and place the fertilizer is needed.

#### Granulation of Solid Fertilizers

Newer granulation processes produce dry, free-flowing, uniformly sized fertilizers. In contrast, older manufacturing processes produced pulverized and moist fertilizers which tended to cake on storage and be distributed with difficulty and dust losses. The dry materials are in great demand in the areas where fertilizer usage is relatively new, such as the Midwest.

The industry is rapidly converting to production of granulated materials and we should see greater production than ever before. Granulation facilities

(Please turn to page 207)

## Now . . . NON-PRESSURIZED liquid-phase heat-transfer systems that operate up to 600° F. **AROCLO 1248**

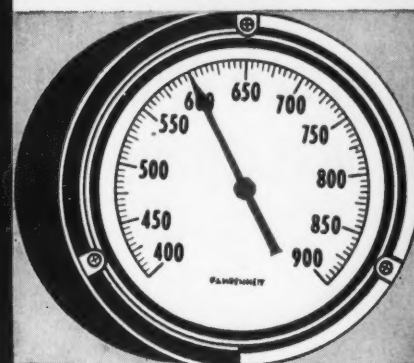
**Operates at atmospheric pressure . . . cuts** installation and maintenance costs of expensive pressurized systems.

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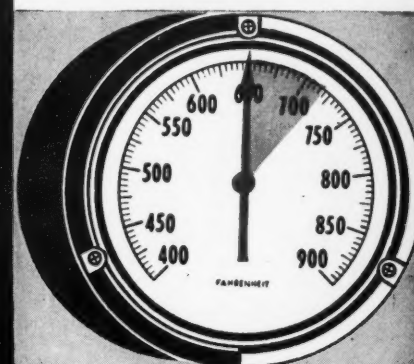
**The Equipment . . . capacities can range from** small portable units—usually electrically heated—to large gas- or oil-fired units generating from 250,000 to over 10,000,000 B.T.U.'s per hour. Circuits are closed, forced circulation. Compact design saves space, minimizes installation and maintenance costs.

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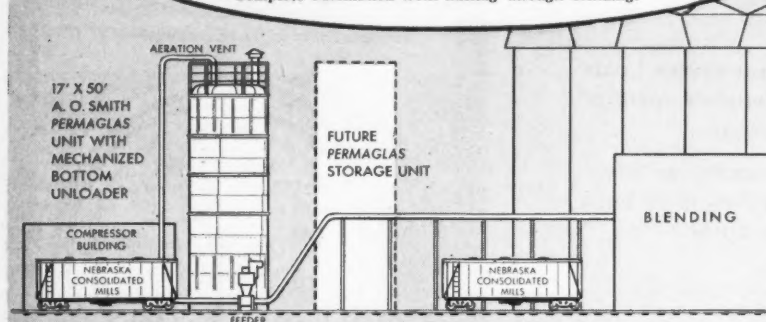


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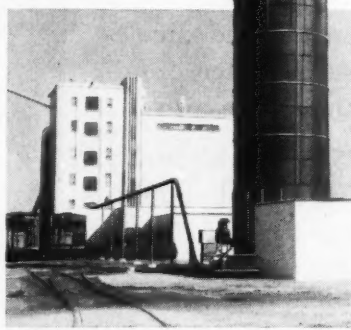
\*Division of, Nebraska Consolidated Mills Co.

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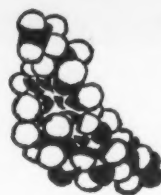
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PLASTICS

The Leaders Speak

## The business picture in 1957 — and its effect on the plastics industry

**ROGER S. FIRESTONE**

President  
Firestone Plastics Company



The chemical industry has increased during the last ten years by 110% compared with a growth of all industry in the United States of 50%. The plastics segment of the chemical industry has grown by 220% during the same period. The word "plastics", of course, covers a multitude of materials having many versatile properties. Of all the plastics, the vinyls have grown fastest, showing a 350% increase during this decade.

It is natural to ask . . . "Why this tremendous growth?"

If we had to find one single answer I believe it would be that synthetics or man-made products are gradually replacing some of those that are dependent on nature. We saw this a number of years ago when rayon displaced silk and cotton in many uses. Another dramatic example was the development of synthetic rubber during the last war. A current example is the use of vinyl resins in flooring, displacing flooring made of linseed oil and other natural products.

There are several reasons for this displacement of natural products by synthetics. Often the synthetic is a superior product. Sometimes there's a shortage of the natural product because of war or other reasons. Probably the most compelling reason, however, is economics. Traditionally, natural products have fluctuated in price, often wildly. The history of plastics and other synthetics has been that their prices have been stable, usually gradually decreasing as volume of production increases.

This trend toward synthetics and plastics should continue during the year 1957.

New plastics are appearing, and improvements on the older plastics material are being made.

### Marketing Opportunities

The vinyls will undoubtedly be the volume leader in 1957. Gradually increased use in automobiles and in flooring are responsible for much of the increased volume, but developments come so fast that other new uses might become even more important during the year. Foamed vinyl as cushioning material is one of the most interesting new uses.

The dollar value of vinyl flooring products increased from 1% to 15% of the market between 1947 and 1955 as compared with decreases in the share of the market on the part of linoleum and asphalted felt-based floor covering.

Increasing efforts to make farms more efficient and to raise profit margins could have a strong effect on the plastics industry in 1957. Polyethylene and vinyl film will be used in much greater quantities to protect crops, to keep weeds under control, to produce more and better fruits and vegetables, to reduce irri-



gation costs by lining irrigation ditches. They provide greenhouses, temporary silos, shelters, insulation and many other aids for the farmer.

As larger homes with more extensive use of modern architectural designs are built, plastics are finding a greater potential in almost every aspect of construction. Wiring, panels, doors, roofs, all lend themselves to more and more uses of plastics.

The suburban trend — six times the rate of urban growth — promotes growth of shopping centers and self-service selling with an emphasis on pre-packaging. Self-service selling practically begs plastics to be used in all forms for efficient and effective packaging as well as for signs and displays of all sorts.

The plastics industry is successfully competing with almost all other materials, many of which have long histories compared with the relatively new plastics field. One can see the tremendous potential open to the plastics industry as the price of these older materials goes up with the general economy and their maintenance costs remain high, while prices of plastics drop and their maintenance costs remain practically nil.

#### Kicks up capacity third time

With latest boost of 25,000 tons annually of titanium dioxide, National Lead is beginning its third expansion in two years. St. Louis titanium pigment plant will be location of new units. National Lead is still constructing a new plant at Varennes, Quebec, and has now completed previous St. Louis expansion. Varennes capacity will



National Lead's pigment plant at St. Louis

be 18,000 tons annually. The last St. Louis expansion added 36,000 tons capacity.

Like the past St. Louis expansion, the new facilities will be engineered for production of either  $\text{TiO}_2$  or titanium calcium pigment.

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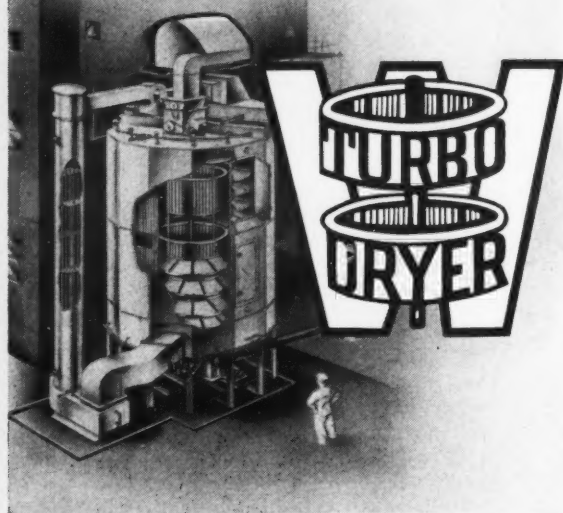


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*The Leaders Speak*

## Chemicals . . . and 1957

ERNEST HART  
President

Food Machinery and Chemical Corporation



In considering factors and trends in the business picture which may be expected to affect the chemical industry this year, we must look at several different aspects of the problem.

### Financing

First, strictly financial considerations could conceivably influence this year's pattern in several ways.

For some years now the most preferred means of financing chemical industry expansion has been through internal financing, both from retained earnings and depreciation accruals. Due to the higher interest rate prevailing for borrowed capital, the tendency towards financing from within will undoubtedly continue to increase this year.

Capital appropriations continued to rise in the chemical and allied industries during 1955 and 1956. The impact of these heavy expenditures of the past two years should begin to affect the production and growth of the chemical industry this year.

Will the rate of increase in capital expenditures remain high in the year ahead? This depends on numerous factors. Among these will be the extent to which decreasing profit margins are overcome by price increases during the coming year. If the overall profit margin performance remains static or dips slightly, there may be smaller amounts of retained earnings which can be used for expansion.

Though the chemical manufacturing industry is its own best customer, its growth potential in the near future depends greatly on the rate of growth

of the other big chemical-consuming industries. To understand the chemical picture, we must look at some trends in these related fields.

Apart from the possible influence of "tight money" policies on this year's expansion patterns, such restrictions of money and credit may also influence the chemical industry because of their effects on consumer purchases of the end-products of industries which are in many cases chemical manufacturers also.

Because of high interest rates, it is not at present certain that consumer purchases are going to remain at a high level, as long as enough money is available. It may be, in fact, that the greater cost of money will serve as a real deterrent to consumer purchases.

### Labor and Foreign Competition

What of the effect of labor policies and developments on the chemical industry? I believe that the trend toward longer contract periods in industry generally will have a steadying influence on chemical operations, through stabilizing demand from some of the chemical industry's customers. This trend may eventually affect negotiations within the chemical industry itself. It is not expected, however, that labor negotiations will have a major widespread effect on our industry.

What of the effect on the markets for chemicals from potential competition from chemical and allied industry overseas? Although imports of aromatic chemicals from Iron Curtain countries rose sizeably in 1956, domestic markets or prices

were not greatly affected by these imports. However, a continuation of the trend towards greater imports might affect the 1957 market picture.

Foreign products may be worth studying in another area, too . . . Japan. Japanese textile imports were watched apprehensively by our textile industry in 1956. If these should hurt us this year, it will have a direct bearing on the supply of chemicals to the industry. However, if negotiations for the voluntary restriction of such imports prove effective, the use of chemicals by the textile business may actually increase next year.

#### Rate of Growth

The Gross National Product (GNP) will, most economists believe, continue to grow at an increasing rate in the immediate future. Chemical industry sales have closely paralleled the growth of the GNP to date, and so should continue to do so.

It is not possible to consider in any detail all the industries whose growth will affect chemical industry sales. However, we might look at some of those whose impact is likely to be greatest.

We in the chemical business watch the growth patterns of the automotive industry for signposts to our industry's future. The consensus is that we will see more new cars produced this year than in 1956.

The extent to which new car production tops last year's figure will bear directly on the sales of many chemicals used in making automobiles. The chemicals most directly affected will be synthetic rubber, synthetic fibers, paints, and plastics.

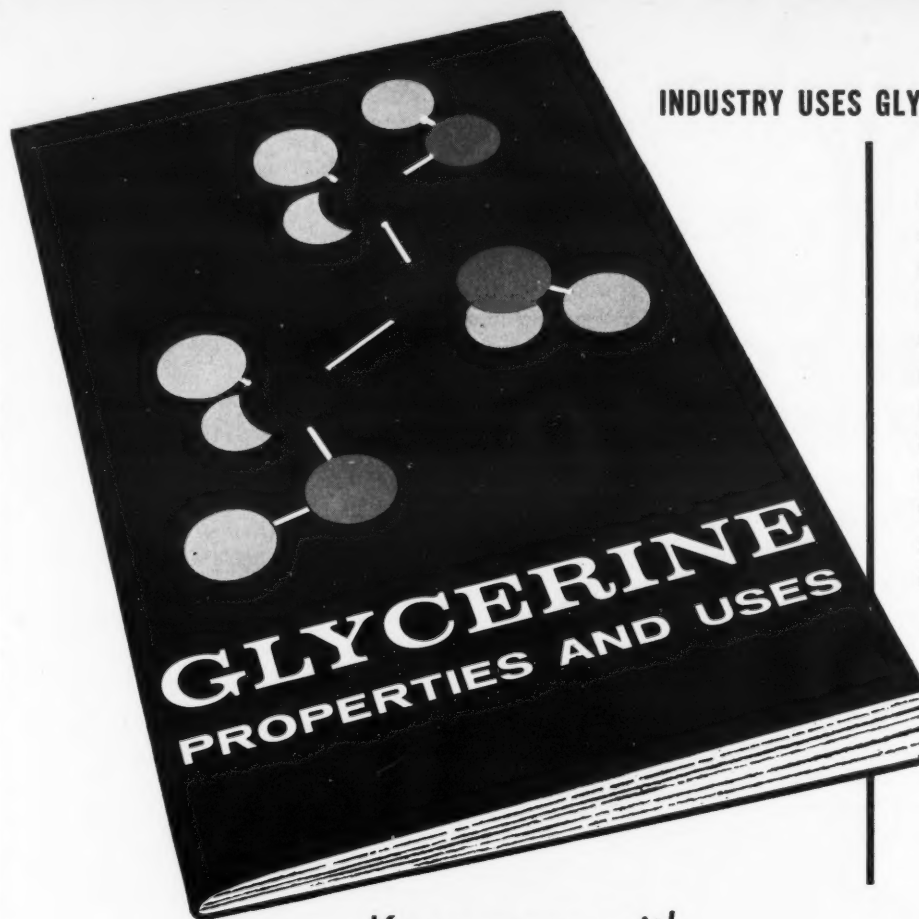
The continued rise in total motor vehicle registrations will automatically sustain the need for operational and maintenance chemicals including such significant items as antifreezes and gasoline and lube oil additives.

The impact of the new Federal highway program will not be felt by most of the chemical industry till subsequent years, but this year will show a modest rise in needs of chemicals for construction.

Apart from the possibility of greater sales of textile chemicals if the Japanese situation is clarified, the production of synthetic fibers and of plastic materials should continue to grow during the year.

There are hopeful signs of a reversal of the downward trend in farm income which occurred in 1956 and we can expect that sales of agricultural chemicals, including plant foods, pesticides and herbicides, will resume a growth trend.

We can also add the optimistic predictions which are being made regarding growth in the petrochemical field. It is safe to conclude from an examination of potential chemical markets that the signs all point to continued growth of our industry in the year ahead.



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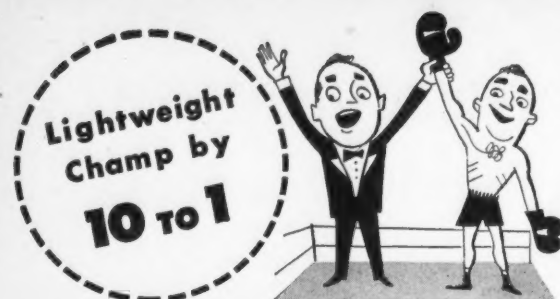
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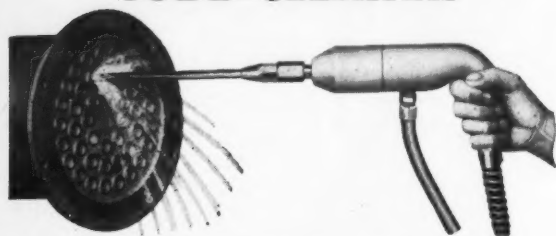
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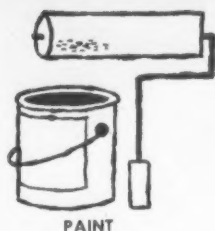


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*The Leaders Speak*

## 1957 paint sales to increase 5 percent over last year

DWIGHT P. JOYCE  
President  
The Glidden Company



America never has enjoyed a more prosperous period than the present, and at no time in the history of the country was there better reason to expect continuing high economic activity.

The most comprehensive measure of economic activity is the Gross National Product, or the dollar value of the Nation's total output of goods and services. Our Gross National Product set a new record of \$391 billion in 1955. In the first part of 1956, however, the Gross National Product had increased to an annual rate of \$398 billion.

Our economy is growing so fast that the latest figures released now show the Gross National Product over the \$400 billion mark for the first time in the history of the nation.

Moreover, during each quarter of 1957, we will see the Gross National Product continuing well above the \$400 billion mark.

Another comprehensive measure of economic activity is civilian employment. In June of this year employment reached 66.5 million, a total which 10 years ago would have been considered incredible.

This year employment is expected to be close to 68 million. In fact, it may well be that the only limitation upon the total number of people employed will be the size of the existing labor force.

A third vitally important measure of economic activity is the amount of income disbursed by private industry and government, generally identified as personal income.

Disposable personal income increased from \$253 billion in 1954 to approximately \$277 billion in

1956. This year, the figure will rise to more than \$300 billion.

Thus, whether we observe economic activity at the stage of production, or of employment, or of income disbursement, we find evidence of progress and prosperity.

### Other Contributing Factors

Through the years many other factors have been quietly adding to the strength of our economy, and the current expansion is fundamentally an expression of their cumulative force.

These additional factors include the upsurge of population, the growth of scientific knowledge, the onrush of technology, the rapid obsolescence of what we formerly regarded as fixed capital, the improved control of inventories, the broadening of the middle class, the insistent desire of people to earn more and to live better, the development of mass markets to match mass production, the rebuilding of the Western World and the growing understanding of people that public policy must protect economic incentive if enterprise, innovation and investment are to flourish.

Practically all indicators point upward. All categories of new construction, except perhaps home building, will be up. More office buildings, hotels, hospitals, warehouses, stores, churches and schools will be built. This will offset any decline in residential building.

Among public construction projects, the road building program will go above all other categories. It is estimated that \$8 billion will be spent

by the Federal, state and municipal governments on the nation's highways and streets in this year alone. Most of this money will be spent to begin the 41,000 mile interstate expressway network which will be four to eight lanes wide and will connect 42 state capitals and 90% of all the cities over 50,000 population.

The road program alone is a tremendous project. Painting a mile of six-inch strip, the most popular width, required 26 gallons of paint. So, for the 41,000 miles of the express network alone, it will take over 4 million gallons of paint for the first application. This does not include edge marking of pavements, which is becoming very popular. It does not include painting of guard rails, steel bridges and a huge number of new traffic signs which will all be built in volume.

The road program itself is a tremendous project and will require millions of gallons of paint. But when we consider that the expressway will open new areas of industrial development and in turn will create new housing, all of which will require the use of paint, the potential begins to get out of the realm of imagination.

#### Prognostication

Paint industry sales went over the 1.5 billion dollar mark for the first time in history in 1955 and show no signs of weakening. According to figures released by the Bureau of the Census, in the first six months of 1956, paint sales were ahead of 1955 by 1.3 percent. New construction is expected to remain at an all-time high and there are now 52 million homes in the United States which need maintenance and repair, with a million more being added each year. Within the framework of such favorable economic conditions, industry sales will see a minimum increase of 5 percent during 1957.

A possible limiting factor in 1957 will be government fiscal policy. A tight money policy will hold back new investment and new construction; therefore, if the Federal Reserve Board continues its tight money policy over a good part of next year, sales will be affected. If the monetary policy is loosened, then sales will be bolstered.

In summary . . . the over-all health of our economy and our industry is excellent, and for the first time in history the Gross National Product will go over the 400 billion dollar mark. Employment will be close to 68 million; disposable income will be over 300 billion dollars; the automobile industry will have made a substantial comeback. Farmers will have more money than they have had in any of the past five years, and wages will be up approximately 10 percent.

These immediate influences, when added to the long-term development of our economy, seem to assure that in 1957 the paint and varnish industry will enjoy a truly outstanding year.

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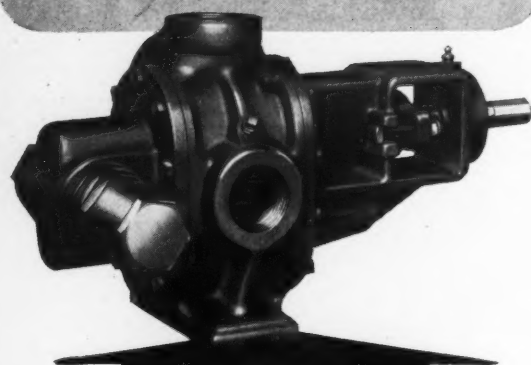
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*The Leaders Speak*

**W. S. RICHARDSON**

*President*  
B. F. Goodrich Chemical Company



## *American rubber industries independent of foreign rubber sources*

When a world crisis threatens an important lifeline like the Suez Canal yet causes little anxiety in Akron or Detroit or anywhere else in America where rubber is used, it serves to point up an historic economic fact:

We in America are no longer dependent upon the natural rubber plantations of the Far East for a raw material which was once this country's biggest single import.

Right here within the borders of our own country we now possess — thanks to the technological advances of the chemical rubber industry — the answers to future shortages of natural rubber. Sixty-one percent of the new rubber being used in the United States today is man-made — from petroleum products and from chemicals readily available to us. And expansion programs which will be completed this year will raise our man-made rubber capacity to 90 percent of our needs for new rubber.

America's independence in rubber is the result of a cycle that started about ten years before Pearl Harbor. In the laboratories of American chemical, petroleum and rubber companies in the 1930's, the man-made rubber industry was created — an industry whose output staved off industrial and economic disaster in World War II.

Now, what of the future? Having demonstrated in the last two decades what research and development can do in the field of rubber chemistry, it becomes apparent that our industry's big potential lies in being able to employ these newly developed technological tools to the best advantage. The trend

toward the use of man-made rubber will continue; will in fact take a major step forward this year with pilot plant production of the newest of the man-made rubbers. One of these is Ameripol SN, which accomplishes the long-sought synthesis of the natural rubber hydrocarbon. Here we have succeeded in duplicating the exact molecular structure of natural rubber, making available a man-made rubber that can do the jobs which up until now only tree-grown rubber could do.

The past year saw Ameripol SN passing rigid tests for acceptability in heavy-duty truck tires, the one area where heretofore we have always needed a certain amount of tree rubber in order to nullify the effects of greater heat build-up. The results of these tests now make it possible for the rubber industry to extend the uses of synthetic/natural rubber into other fields. And the fact that our own man-made duplicate of tree rubber is suitable for these uses should spur research by the producers of natural rubber. The restrictions and controls put on natural rubber by foreign governments in the years when America was wholly dependent upon tree-grown rubber brought drastic price fluctuations. And these foreign government-created shortages stimulated American research that led to the creation of a man-made rubber industry in this country. Whether the rubber-growing nations can now rise to the occasion and through research and development find a way to get back some of the lost multi-billion-dollar rubber business remains to be seen.

Elsewhere in the chemical rubber industry, all signs point to increasing diversification into fields where



## chemical business

so far we have merely dented the economical potential. Plastics, the copolymer cousins of the rubber chemicals, offer almost limitless opportunities. The chemical divisions of the rubber companies are the fastest growing members of the family. In plastics, as in rubber for tires, we have long since emerged from the period when end products made of synthetic raw materials were called "substitutes." We now have plastic textiles, plastic adhesives and plastic structural materials that are even better than the natural materials they are fast displacing.

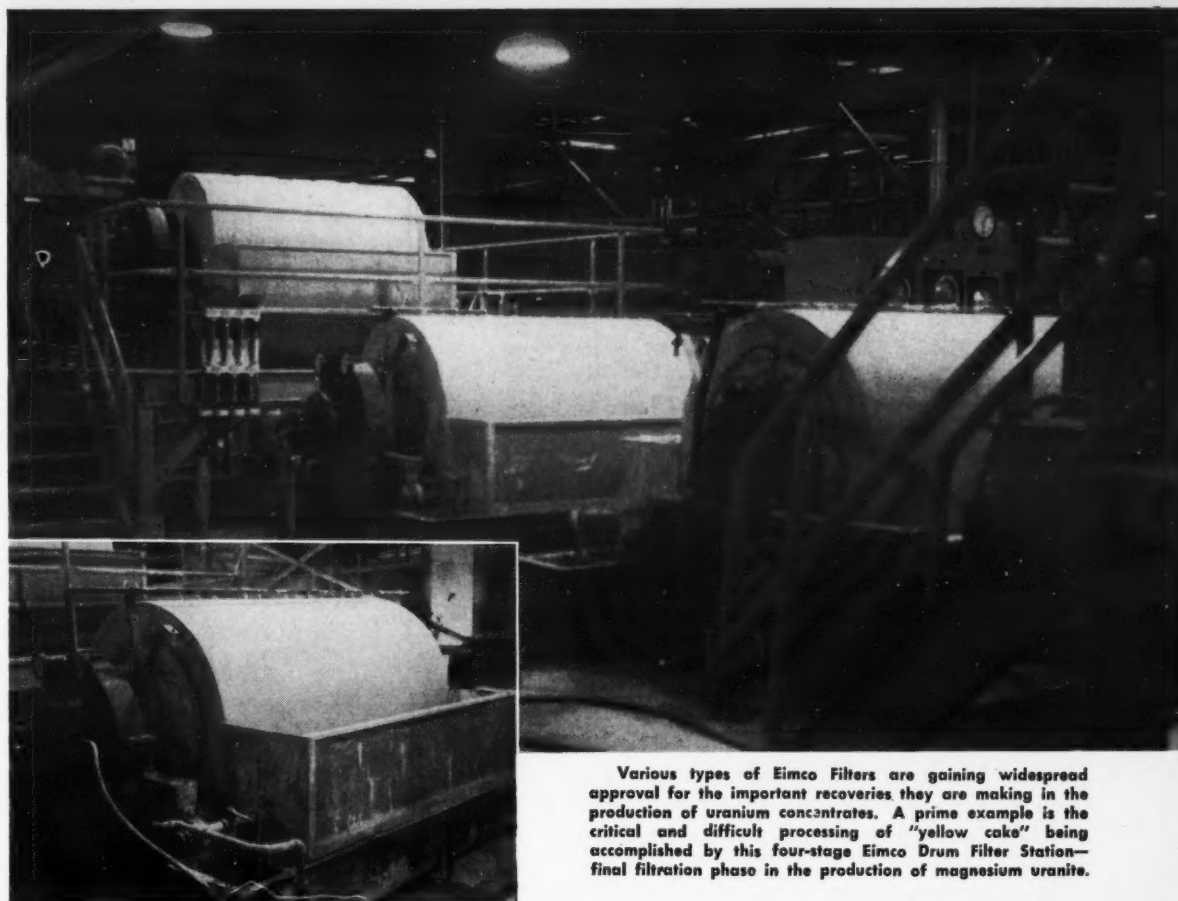
Great strides have been made in the textile field, particularly in the development of textiles needed by the rubber industry. The years immediately ahead will see even greater development in textiles for tire cord, for conveyor belting, and wherever fabrics need to be combined with rubber. At the same time, the chemical rubber industry is continuing its research and development of rubber and chemicals that can be used to treat fabrics for heavy-duty wear and tear. Cotton denim, for example, has been upgraded by the application of both textile and rubber-industry technology which has produced a more durable material for work and play clothes.

The natural fibers like wool, silk and cotton are more and more giving way to the synthetics. Ten years ago one would have been foolhardy to speculate that some day the rubber industry would be turning out a material that could duplicate animal fur. But that is exactly what's happening today. Chemists working in our Research Center have produced a synthetic fiber that has virtually all of the richness and quality of wool and almost none of the minus properties. The garment industry is now using this material to produce coats that can be sold at a lower price and yet outwear natural fur.

In adhesives, rubber chemistry is constantly bringing into the market new materials that provide better bonding agents for joining the traditional building materials of wood, glass, metal and ceramics to other surfaces; for bonding rubber to metal, and for making plastic laminates. Several new developments in adhesives lie immediately ahead, making possible further diversification of the chemical rubber industry.

### Tomorrow?

In summary, we have seen in a generation many examples of man's improvements upon nature through technological development in rubber chemistry. One might observe that rubber chemistry has done just about everything possible to improve upon nature's product. But what of rubber's abilities in the higher atmospheres — in the sound and heat barriers which jet planes and guided missiles travel? Our laboratories are making use of atomic tracers as measuring instruments in studies aimed at increasing the life of rubber and rubber products under heretofore unknown conditions of heat and cold and speed. We have learned much from these studies. We shall continue to learn this year and in the years ahead how we can better adapt our products to fit this changing world in which we live.



Various types of Eimco Filters are gaining widespread approval for the important recoveries they are making in the production of uranium concentrates. A prime example is the critical and difficult processing of "yellow cake" being accomplished by this four-stage Eimco Drum Filter Station—final filtration phase in the production of magnesium uranite.

## EIMCOS FILL TOUGH ROLE FOR URANIUM FIRM

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In these filtering stages, the main objective is removal of chloride contamination from the yellow cake. The Eimco Drum Filters are performing very satisfactorily under operating conditions made extremely difficult by physical characteristics of the solids.

The thin cakes exhibit severe cracking tendencies and are very adhesive, which makes washing and cake discharge difficult.

Washing becomes ineffective when wash water is short circuited thru cracks in the cake. To minimize this adversity, Eimco Drum Filters permit washing close to the slurry level, assuring a moist cake surface.

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B-231

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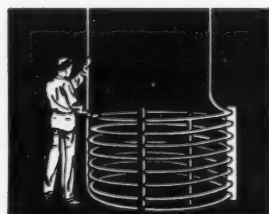
The cost of chemical processing equipment can be measured by the pound, by the square foot, by the unit, or by other yardsticks. Only one cost, however, is truly significant or all inclusive: the equipment cost per pound or ton of product per year.

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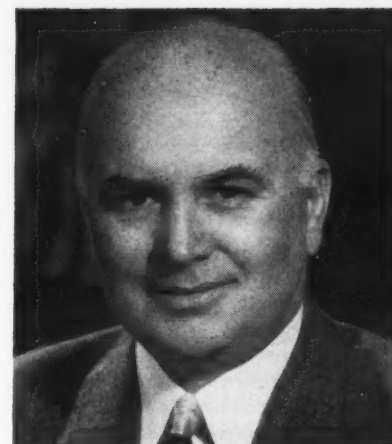


*The Leaders Speak*

**E. J. THOMAS**

*President*

The Goodyear Tire & Rubber Company



## *Outlook for the rubber industry in 1957*

Expectations for the rubber industry in 1957 are for a continued expanding of sales at a fair profit and for a high level of employment and wages.

The benefits of the industry's progress should also be widespread, extending to customers, shareholders, employees, suppliers, the public, and government alike.

Basically, the general business situation and our national economy should be comparatively good, healthy and vigorous in terms of industrial production, widespread purchasing power, new and attractive products and innovations, the willingness and ability of people to buy, and an encouraging climate of peace, prosperity, and security.

These are discernible factors at this time, and bear importantly on the rubber industry's prospects for this year. However, should there occur a sharp deterioration in international relations or a substantial reversal of our present economic and political stability here at home, the outlook would quickly change.

Rubber is a basic material. Few commodities have such a rapidly expanding world-wide market. All factors and trends in the business situation indicate that the industry is destined for continued growth and expansion at home, and that foreign markets offer tremendous possibilities for similar expansion along the same lines.

Rubber consumption has become an excellent and highly dependable measurement of

the relative prosperity and standards of living of peoples in various countries — just as steel production, automobiles per capita, telephones per person are good yardsticks. It is significant, therefore, that here in the United States consumption of new rubber increased from 650,000 long tons a year, just before World War II, to an expected 1,500,000 tons in 1957 — an increase of 130%. The rest of the world combined uses about the same tonnage as the United States.

Domestically, rubber is now used at the rate of 20 pounds per person annually, while in the remainder of the world it averages about one pound. Canada, England and Australia are using about ten pounds per person; Russia two pounds; and India and China but a few ounces.

Our estimated needs of 1,500,000 long tons this year amount to an increase of 5% over last, when we used 1,425,000 tons. In 1956, the source of our rubber consumption was approximately 60% synthetic and 40% natural rubber. The synthetic percentage will continue to increase, thus keeping in check any runaway crude rubber prices.

Before the war, the ratio of rubber usage was about 70% for tires and 30% for non-tire products. As an indication of the industry's expanding diversification, we estimate that tires this year will use only about 60% of the total new rubber, and non-tire products, 40%.



## chemical business

Replacement tire business in 1957 should increase, in both units and value. There are more passenger cars, trucks, and farm tractors and implements in use than ever before, and these vehicles are piling up greater mileages than at any previous time.

Original equipment tire volume should be higher, too — with production of new improved 1957 models. Favorable factors include population increase, more suburban families desiring two cars, greater freight tonnage by truck, a great need for trucks and giant earthmoving equipment to build the new streets and highways we need, and increased farm mechanization stimulated by improved income of the farm population.

Naturally, the industry is vitally interested in the dual economic-tax impact of the new multi-billion dollar highway building program. Before the President signed this \$50-billion highway construction program, the rubber manufacturers were clearing the decks to meet their share of the responsibility and challenge of the greatest public works program ever proposed.

The Federal government has levied heavy taxes on tires and retread rubber, over the next decade, as the industry's share of the huge cost involved in this road-construction program. That is one side of the picture. On the other side, the increase in the volume of business for many segments of our economy will be tremendous.

Those closest to the program estimate that it will create 300,000 new jobs, and that 90,000 new units of road-building equipment and machinery and 60,000 more trucks — with their heavy requirements in tires and other automotive rubber products — will be needed to do the job on schedule.

We must have these new highways, and our industry has for many years been in the forefront of the fight for the better roads which are vital to our economic welfare and to our enjoyment of the rich fruits of motor transportation.

Taking a look at the non-tire categories of our industry, the picture is one of great and rapidly expanding activity. One of the most important of these is industrial rubber products, including belting, hose, molded goods — all of which should expand with the increased industrial activity of the country.

We look forward to the increased use of conveyor belts — in sizes, lengths and carrying capacities greater than ever — for large construction projects and mining operations. Some of these conveyor belts today are two miles long. The increasing accent on automation in American industry opens new markets for the use of conveyor belts.

Markets are likewise expanding in films, foam and flooring; in chemicals, which include the manufacture of synthetic rubber; and in shoe products.

In some segments of the industry, the manufacture of aviation products and complete aircraft units is

(Please turn to page 209)



Edward M. Deasy  
ASSISTANT PLANT MANAGER  
Thiokol Chemical Corporation  
Trenton, New Jersey



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LAN-O-KLEEN removes 95% of all dirt and grime encountered in industry.

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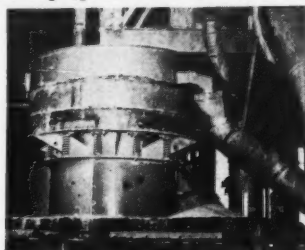


# SCREENING NEWS

## Colgate Puts 6 Tons/Hr. of FAB and VEL thru a 48" SWECO

Colgate-Palmolive, S. A., Mexico, D. F., the largest producer of detergents in Central America, now screens upwards of 6 tons per hour of FAB and VEL with a 48" dia. SWECO. The material is conveyed directly to a special feeder over the center of the SWECO Separator. Oversize and lump (plus 8 mesh) materials are returned to processing for 100 per cent recovery, while minus 10 mesh product is conveyed to the Packing Department.

Production Control reports improved uniformity, throughput beyond anticipated capacity, and a sharp drop in maintenance costs. Customer comment: "... results are highly satisfactory."

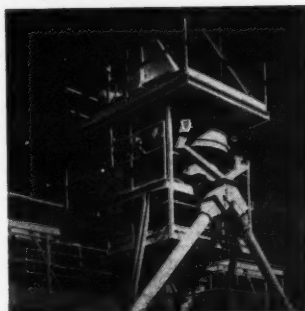


COLGATE DETERGENT SCREENING operation in Mexico City Plant. Plus 8 mesh material is reprocessed; minus 10 is packaged.

## SWECO Eliminates Screen Blinding— Cleans Catalyst Pellets for Filtrol

Filtrol Corporation, Salt Lake City, Utah, had been using a conventional rectangular shaker screen to remove "fines" from extruded catalyst pellets. Maintenance was high due to screen blinding and the difficulty of cleaning the equipment.

The Company now obtains high capacity output from its 48" dia. SWECO Vibrating Screen Separator. The Separator cleans all "fines" from finished TCC grade pellets without blinding.



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*The Leaders Speak*

**JOHN E. McKEEN**

*President*  
Chas. Pfizer & Co., Inc.



## Research, population growth point to gains in pharmaceuticals

Research developments, which have kept the pharmaceutical industry rolling rapidly forward over the past decade, are likely to spur further gains in the year ahead.

Except for a short-term downward trend in 1952, drug industry sales have advanced steadily over the past ten years. The bulk of this progress can be traced to the development of new products which have contributed to a dramatically rising level of health — for more people than ever before. Currently, US population is increasing annually, at a rate of more than 1.5 percent. Even without any other major research achievements, the pharmaceutical industry could look ahead to further moderate gains based on this increasing population and continued high level of disposable income.

Equally important is the changing age pattern of the population. With death rates cut drastically at both ends of the life scale, there are today more younger and more older Americans. This means a rising need for specialized drugs — pediatric specialties for the young, and geriatric formulations for the elderly.

Another significant point in the changing pharmaceutical market is that people today allot their drug dollar somewhat differently from previous generations. In 15 years between 1939 and 1954, the proportion of prescription drug sales to total drug sales rose gradually from 50 percent to about 65 percent, although both categories have scored gains in dollar volume. This trend reflects the

fact that modern medicines are more potent and effective, and must be administered under a doctor's care. It also indicates that Americans today are more health conscious, and with disposable income at an all-time high, they seek treatment by a physician more often.

### Antibiotics

Despite advances already made in chemotherapy, however, the pharmaceutical industry is still a long way from scraping the bottom of the research barrel. Antibiotic research is still unfolding new and more powerful weapons. Last year, several new antibiotics were marketed which are especially effective in knocking out certain germs that have resisted attack by all other available drugs.

By combining antibiotics, scientists are sometimes able to produce a single preparation with a therapeutic effect greater than the sum of the separate agents used individually — a concept known as synergism.

The use of such new combinations has opened up what has been termed a "third era" in antibiotic therapy by Dr. Henry Welch, director of the Antibiotics Division of the US Food and Drug Administration. Speaking at the Fourth Annual Antibiotics Symposium in Washington, D.C. last October, Dr. Welch said that this third era — of synergism and combined attack — shows "a distinct trend towards combined therapy, not an old fashioned 'shotgun approach' but a calculated, rational method of attacking the problem of

resistant organisms." Thus, the new antibiotic combinations provide doctors with a single preparation of higher effectiveness, even against disease germs previously left unscathed.

#### Tension-relieving Compounds

Aside from antibiotics, recent research efforts have added whole new classes of drugs. Most important of the newer drugs from the standpoint of markets are the tension-relieving compounds. Unlike the slightly older drugs used by psychiatrists to treat severely disturbed mental patients in hospitals, these newer compounds are for the use of general practitioners in treating everyday, "normal" stress. One authority has estimated that one in every four patients who consult a general physician suffers from tension and anxiety.

Estimates placed the 1956 market potential for antitension drugs at over \$150 million, and 1957 demand may go well beyond that if current trends continue.

#### Other Developments

Another class of drugs assuming increasing importance, especially in treating crippling arthritis, are the corticoids — adrenal cortex hormones and similar synthetic compounds. Sales of corticoids doubled between 1954 and 1955.

In the field of experimental biologicals, development of a live-virus anti-polio dosage to be taken by mouth may eventually bring a shift in immunization against this disease. Two new oral products were reported in 1956 on an experimental basis. Pending further testing, and development of production methods, however, it is difficult to predict when a live virus vaccine might be marketed.

Much current pharmaceutical research is aimed at finding drugs against cancer, heart disease, the common cold, and other diseases for which effective drugs are lacking. Any break-through in these fields during the forthcoming year would, of course, be a boon to both the public and the industry.

#### International Trade

As US pharmaceutical companies have taken world leadership in new drug development, they have met increasing problems in international trade. In recent years, dollar scarcities and growing foreign competition have squeezed sales of US drugs to countries abroad.

To offset these restricting factors, the industry has substantially increased its capital investment in foreign countries. Several new American-built plants went on stream in 1956, and others are scheduled for completion in 1957.

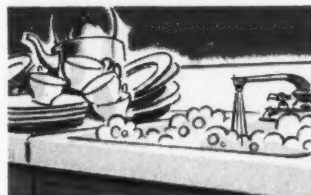
In the export field, shipments of US drugs to foreign nations hinge largely on health programs undertaken abroad, availability of funds, and the competitive growth of local pharmaceutical production. These factors vary from year to year around the world.

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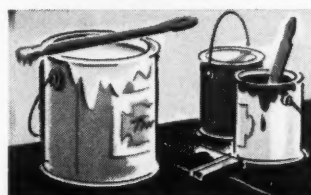
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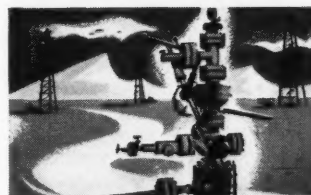
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**Lower than usual acid-wash color** gives higher product quality.

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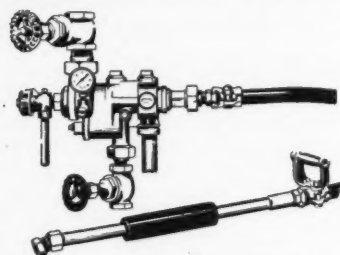




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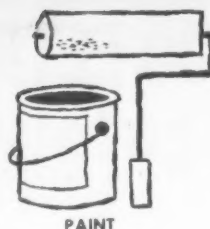
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*The Leaders Speak*

## Paint technology . . . which way in 1957?

**ARTHUR W. STEUDEL**  
*President*  
The Sherwin-Williams Co.



With the many new and improved raw materials available to the paint and varnish industry, it is difficult if not impossible to point to any single factor or group of factors likely to have the most effect technologically this year. In fact, this very abundance of materials may itself be the most important element in the industry's immediate technological progress.

However, that is undoubtedly an oversimplification. New and improved production methods will also play a decisive role in that progress. And certainly the changing demands of the market will also stimulate technological improvements. It must be remembered that in the paint industry it is often the search for product properties demanded by the customer that leads the manufacturer down new and productive technological paths.

### *Materials*

In the field of materials, the continued improvement in heteropolymers promises to have tremendous impact. It has already. The new automotive finish, "Exlon," is a case in point. Combining many of the qualities of both lacquer and synthetic enamel, it is a direct result of work with heteropolymers. There is every reason to believe that further technological developments in this area will have widespread application in other fields in the immediate future.

But this is only one material development — and not necessarily the most important — with which the industry is concerned. Epoxies, polyesters, methacrylates, phenolics, acrylics, polyvinyl ace-

tates, isocyanates — all these and many others have brought the industry to the point where almost countless roads to progress may be followed.

Many of the pigments that today make possible the vivid and permanent colors now highly popular were formerly used principally as dyestuffs. Technological advances in their texture and wetting characteristics have made them highly useful as paint pigments. The techniques employed are certain to have immediate application in the production of other pigments for other finishes.

Emulsion technology has also progressed to where hitherto impossible things can be expected of it. Methods of utilizing water-soluble cellulose derivatives, for example, have brought the new and challenging multi-color finishes. At the same time, increasing technological knowledge in this field has produced emulsion finishes for industrial applications that give superior performance and added safety against fire and toxicity hazards. We are moving toward what may turn out to be an entirely new era in the paint industry.

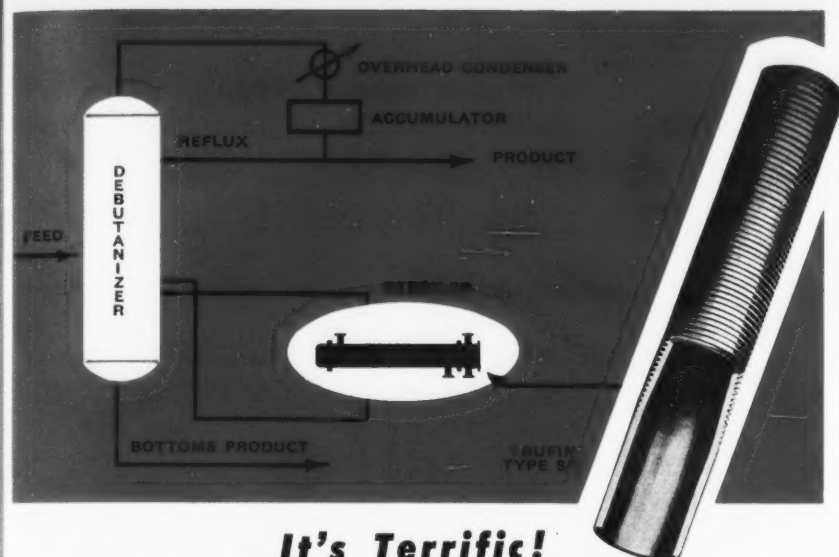
Choosing which development will have the greatest effect on the industry must be a matter of guesswork. Progress is being made with all these materials and developments. Any one or several of them could hold the clue to progress.

Similarly, there may be a key to the future in the promising developments in manufacturing methods, an extremely active area of the industry. Certainly there will be continued improvement in

(Please turn to page 43)

CHEMICAL PROCESSING





***It's Terrific!***

## ONE TRUFIN-TUBED DEBUTANIZER UNIT REPLACES TWO PLAIN TUBE REBOILERS

By Ernest Dodd

During a recent field trip I ran into an interesting heat transfer story. It has its setting in a large Midwest refinery and—after the facts had been assembled—here's the way it added up.

To obtain a heat duty of 2,382,000 BTU's per hour the refinery engineers had on stream two reboilers—one tubed with 407-3/4" O.D. x 14 BWG x 16' long electric-welded steel tubes—the other with 348 similar tubes.

Now don't mistake me. There was nothing basically wrong with this installation. It was doing a good job and the engineers were happy with it—happy, that is, until they listened to a Wolverine technical sales representative who appeared on the scene just as the 348-tube unit came off stream for retubing. The man from Wolverine told his story and things will never again be the same around that refinery. Here's why!

The off-stream unit was retubed with 348 lengths of electric-welded steel Wolverine Trufin® Type S/T—the integral finned condenser tube. Because of the integral fins, Trufin Type S/T has double the heat transfer surface of plain tube. In addition to extracting more BTU's per foot of tube it also packs more heat transfer surface into a given area.

Because of this, the single Trufin-tubed reboiler is carrying as much heat load as that formerly handled by the two prime surface units. In

the bargain the refinery engineers recently increased throughput in the column and the Trufin-tubed unit is still able to deliver the required heat duty.

There's a moral to this heat transfer story and it isn't hard to find: consult Wolverine's Field Engineering Service if you're looking for increased heat transfer performance. You'll boost production, cut costs, do a better all around job.

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## INTEGRAL DESIGN HELPS TRUFIN FIGHT VIBRATION

The fins of Wolverine Trufin are integral—squeezed directly from the tube wall. As a result there is no possibility of a "fin joint efficiency loss" because of vibration, thermal shock or varying pressures. The fins of Wolverine Trufin remain constant during the life of the tube.

In addition, the heavier gauge of the end section and the standard gauge of the finned tube results in a short length of tapered wall thickness and inside diameter. Because of this, the Trufin tube gives maximum rigidity at the end section where service stresses tend to concentrate. The smooth, gradual taper on the inside diameter has the additional feature of lessening turbulence which also helps increase Trufin's life expectancy.

## Cuts Structural Weight

Because Wolverine Trufin packs more heat transfer surface in a given area it permits the design of smaller heat exchangers and condensers. As a result, where overhead units are used, the more compact, more powerful Trufin units require less structural support—a feature which often means substantial savings.

## SEND FOR FREE BOOK

Probably the most comprehensive source of information available anywhere on finned condenser tubes is to be found in Wolverine's Trufin Opportunity Book. Here engineers will find valuable design information, fouling



data and applications as well as many actual case studies. This book is yours absolutely—FREE! Write for your copy—TODAY!

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You can save time—lots of it—by using prefabricated Wolverine U-Bend condenser tubes in either finned (Wolverine Trufin®) or prime surface form.

Wolverine bends condenser tubes to your specifications—ships them in disposable box-type pallets in the exact order of their installation—ready for direct insertion into your heat exchanger or condenser.

In addition to assembly time, you eliminate the transportation, space and handling headaches present when dealing with tubes over 30 feet long. One tube sheet is eliminated and floating head problems are reduced. Rolling in operations are cut in half.

Wolverine prime surface tube U-Bends are available in a wide range of sizes and alloys in copper, copper-base alloys and aluminum. Capacity boosting Trufin U-Bends are available in copper, copper-base alloys, aluminum and electric-welded steel. Complete information is contained in Wolverine's Condenser Tube Catalog. Write today.

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## chemical business

milling equipment. New types of mills that promise better dispersion, higher gloss and less settling of the product in the package are in the works. In the meantime, older type mills are being improved.

However, other improvements are also making headway. Increasing instrumentation looms large as one of these. It is expanding rapidly in testing, in analysis, in product performance. Color-difference meters that provide greater control of color uniformity are coming into their own. Among other instruments of increasing importance are the infrared and ultraviolet spectrophotometers. Flame photometry and gas chromatography will give tightened control over raw materials.

### Effect of Marketing Trends

Perhaps a brief examination of some of the major trends in market demand will reveal the direction in which technology will move.

There is an increasing demand for finishes that can be applied to flat strips of sheet metals to be formed after finishing. This requires finishing materials that are extremely flexible and durable. Will this growing demand set off the technological developments that will emerge as most important to the industry?

Or will the burgeoning demand for more corrosion-resistant finishes provide the impetus for those technological advances? It would be a kind of poetic justice if the chemical industry, which has given the paint industry so many of its promising new raw materials were also to spark the most important technological developments of the immediate future.

Maybe the answer is to be found in another field which the paint industry serves. Will the increasing use of water-absorbent building materials such as stucco, cement block, asbestos shingles, spark the technological efforts that will have the most impact?

All of these trends and many others must be considered. But there is one other trend which may overshadow them all in its effect on technology in the paint industry . . . the universal trend to color.

The demand for more and more colors in paint has already affected paint technology greatly. Now we demand color in finishes which before were considered as only "protective." As a result, the paint industry is going to have to produce a wide range of durable colors in paints that will withstand constant contact with a wide variety of chemicals and corrosive atmospheres. It could well be that in solving the problems this demand poses, paint chemists and technicians will take the technological steps that will have the most effect on the industry.

For more information on product at left, specify 1043 . . . see information request blank opposite last page.

# Staley solves waste disposal problem with an Allis-Chalmers tractor shovel



**Cuts the trench.** The first step in Staley's landfill system is to cut a trench. Their Allis-Chalmers HD-11G, with 111 net engine hp and a large-capacity hydraulic system, easily handles tough excavating. It is also mobile enough to carry excavated material to conveniently located stockpiles.

**Spreads and compacts refuse.** A truck dumps refuse at the head of the trench. The HD-11G then pushes or carries refuse with the bucket and spreads it in the ditch. Utilizing its 32,000 lb of weight, the crawler tractor compacts the material to a small fraction of its original volume.



## Adopts highly successful landfill system

Most plants have one by-product and one problem in common. The by-product is waste and the problem is how to dispose of it. Staley Manufacturing Company, Decatur, Illinois, disposes of both the waste and the problem with an Allis-Chalmers HD-11G tractor shovel.

• By adopting the sanitary landfill system, this large manufacturer of soybean and corn products now disposes of refuse quickly and cleanly. There are no unsightly dumps . . . no hillside "smudgepots" . . . no breeding places for insects and rodents. Further, the system requires a minimum of man power and equipment. This picture story describes how one Allis-Chalmers HD-11G tractor shovel handles Staley's three-step landfill operation.

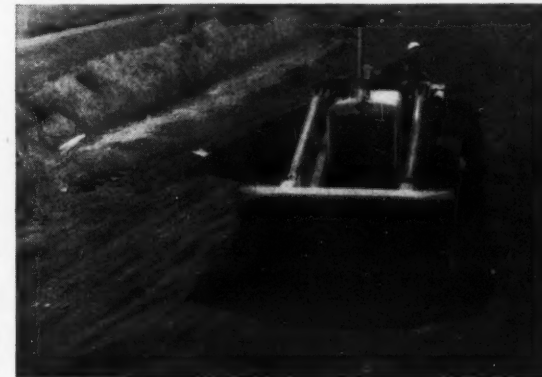
This versatile machine can help solve your waste disposal problem—and double as a material handling and yard maintenance machine. Write for free literature on all four sizes of tractor shovels from 1½ to 4 cu yd, or see your Allis-Chalmers construction machinery dealer.

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## ALLIS-CHALMERS



**Seals it in forever.** At the end of each day, the tractor shovel takes dirt from stockpiles—2¼ cu yd at a pass—and spreads it over compacted refuse, leaving smooth, clean, level land. In many cases, useless lowlands have been reclaimed by the landfill system and later put to valuable use as playgrounds or building sites.



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# ALL OVER THE WORLD

**In the Plants  
of One Company**

The pictures shown here are of Abbé Dispersall Mixer installations in a few of the foreign plants of a world-famous manufacturer of cosmetics. There are many more. These mixers are used in the manufacture of tooth and other pastes.

The fact that this company has adopted Abbé Dispersall Mixers for pastes in its foreign plants (as well as in its domestic factories) is ample evidence of the superior performance of these mixers.

## Here's What They Say About These **ABBÉ DISPERSALL MIXERS:**

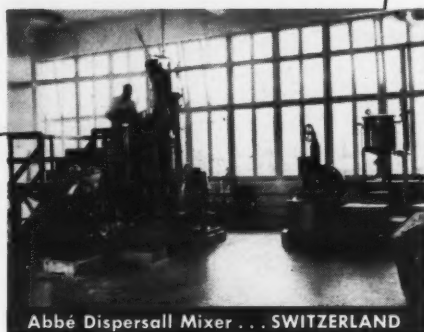
"They have met our requirements for a versatile piece of equipment suitable for relatively small scale production. They have the valuable quality of being easy to clean, which, as you can appreciate, is a decided advantage when more than one product is made in the same machine."

### If You Are Mixing Liquids or Pastes...

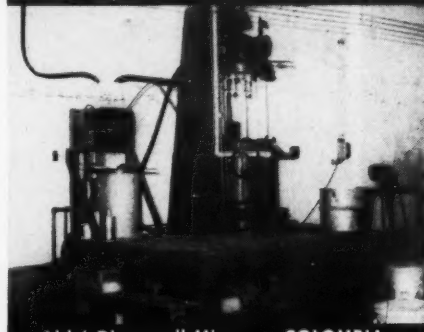
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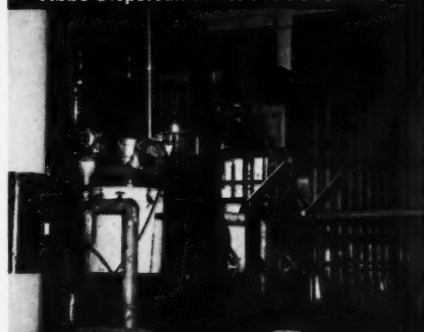
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Abbé Dispersall Mixer ... DENMARK



*The Leaders Speak*

## Plant food use to be ahead of 1956

**KENNETH A. SPENCER**  
*President*  
Spencer Chemical Company



In any discussion of the year ahead in the fertilizer industry, we believe there are several basic factors which will affect future development and which must be taken into consideration. We'll discuss these point by point.

### Farm Income

Recent estimates indicated a slightly larger net income to farm operators in 1956 than in 1955. These estimates were based upon slightly higher prices for farm products in 1956, and payments to farmers under the Soil Bank and Wool Program. Although farm production expenses were also expected to rise in 1956, the gross is estimated to be up enough to increase farmers' nets above the 1955 total — the first year-to-year increase since 1951. The government's export programs, especially of cotton, wheat, and rice, are helping to end the building of stockpiles which always depress prices.

We are no longer experiencing the very close correlation between plant food consumption and previous years' farm income which was true until about six years ago. However, farm income still plays an important role in influencing the succeeding years' fertilizer use, especially in certain regions of the country. We expect, therefore, that if the estimates of slightly higher farm income for 1956 were accurate, this factor should have some favorable effect upon fertilizer use during this year.

### Tight Credit

The present policy by the Federal Reserve to stabilize the dollar is resulting in higher interest rates, and may have some detrimental effects on fertilizer use, particularly in farming areas which have experienced severe drought and are already hard pressed for funds. Bankers have tightened up somewhat on farm loans.

A considerable portion of the fertilizer business is transacted on credit. How the tighter credit policy will affect this year's fertilizer business is difficult to predict.

### Soil Bank

In 1956 The Soil Bank Plan according to USDA estimates amounted to nearly a quarter of a billion dollars in payments to farmers. Most of the acreage, at least in the drought areas, upon which these payments were made last year would have resulted in little or no production had the crops been left to mature. Thus, the major portion of the money paid to farmers under this program in 1956 represents a net increase in farm income, a portion of which will subsequently be spent for fertilizer.

### Increased Competition

An important factor which will affect the industry is the increased competition, especially in nitrogen. The number of new ammonia plants which are coming on stream is a compelling factor. Seven years ago, early in 1950, there were nineteen syn-

thetic ammonia plants operating in this country. These plants had a combined annual capacity of about 1,800,000 tons of ammonia. By the end of 1957 it is expected there will be 55 such plants operating with a combined annual capacity of nearly five million tons of ammonia. This is nearly a three-fold increase in six years.

We are estimating that for the present fertilizer year (the year ending June 30, 1957) there will be a nitrogen surplus of about 22 percent of the total supply from all sources. Last fertilizer year there appeared to be a surplus of about 18 percent.

We feel that if present trends in demand continue, it will be four to five years before demand catches up with supply, assuming no more plants are constructed than are now anticipated. Since there will be considerably more fertilizer materials produced this year than last, more money, time, and effort will be spent in promotional and educational work, and this undoubtedly will tend to increase total consumption.

The prices of nitrogen fertilizers are down some from the prices in effect a year ago. Some of this price decline results from lower f.o.b. plant prices, and some from greater freight equalization as a result of the new basing points created by new plant locations.

#### Increasing Population

Our population is increasing at the rate of approximately 2.8 million people per year or in the neighborhood of 1.6 percent. These 2.8 million additional people must be fed from a relatively stable amount of cropland. The long-term effects will be quite sizeable. Estimates are that this country's population may increase from the present 169 million to 228 million by 1975, and our cropland acreage will remain relatively constant.

As our economy continues to expand, more and more opportunities are arising to absorb farm population into industry. If our farm population continues to decrease, those remaining on farms must operate more efficiently, through the use of modern technology, in order to feed more and more people per unit of farm work.

In conclusion we anticipate, for some of the reasons outlined here, that total plant food use will increase this year; however, it will be an even more competitive year. Sound judgment in directing more intensified educational and promotional activities to help bring about the optimum use of fertilizer in accordance with best farm practice will require the maximum effort on the part of all producers.

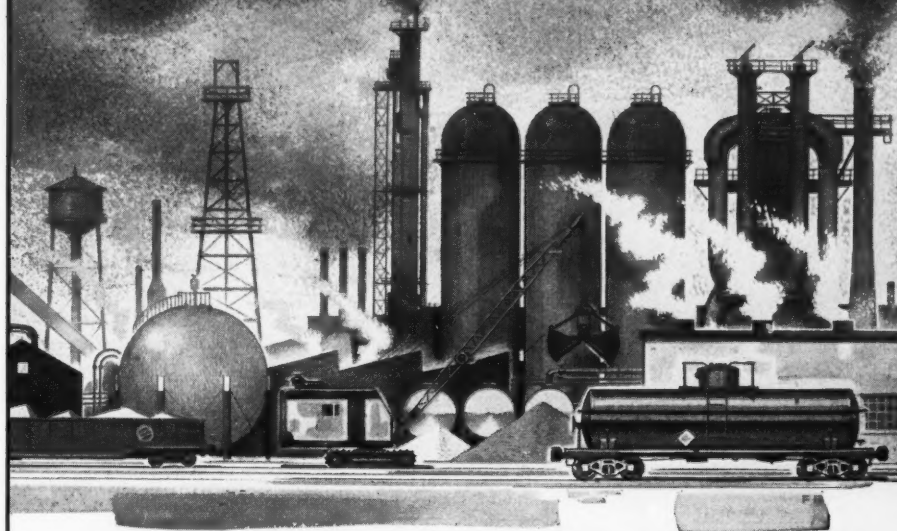
This month's Processing and Engineering  
Data section starts on page 204

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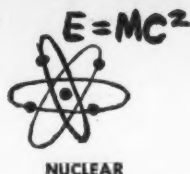


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*The Leaders Speak*

J. CARLTON WARD JR.

*President*

Vitro Corporation of America



## *Business conditions in 1957 — their impact on atomic energy growth*

The expected continuance of business and industrial activity at a high level during 1957 promises a favorable climate for continued progress in the development and application of atomic energy. Aggressive research and engineering is vital at this stage for we have much to learn before the atom is effectively and economically harnessed to the production of electricity, the propulsion of vehicles, and to the processing of industrial and commercial products.

### *Substantial Investments*

An extended period of satisfactory sales and profits will enable dozens of companies active or interested in the nuclear realm to invest substantial sums in atomic research and development. An economic downturn, on the other hand, might well restrict such expenditures and thus retard nuclear progress, at least on the industrial front.

In the nuclear power field, a continued high level of industrial activity will have an important though indirect impact on atomic progress.

As more and more convenient power plants are built, fuel costs are expected to creep gradually upward, thus broadening the area in which nuclear power plants may soon become competitive. This, in turn, will stimulate more widespread interest in the development and use of economical atomic power plants.

In fact, many utility companies or groups of such

companies are currently studying the possibility of building nuclear power projects in their service areas. The joint effort of the three Florida utilities and the recently announced plan of three power firms in North and South Carolina and Virginia are examples of things to come. Several other such projects may well be initiated during 1957, in addition to the progress due to be achieved on the ten nuclear power installations already launched.

Such progress in the power reactor field brings closer the day of substantial demand for nuclear materials, reactor components and related equipment. While 1957 will not see a marked increase in such needs, it will probably bring a steeper angle to the sales curve for such items. The demand for uranium fuel, and in some cases for fertile thorium, will increase with each new reactor. The hope, and in fact the possibility, is that demand for these nuclear fuels for use in power and propulsion reactors will climb to a sufficiently high level by 1965 to help offset a decline in the demand for nuclear weapons material which might develop about that time.

Every step forward in reactor development has an impact on the future demand for such special materials as zirconium, beryllium, hafnium and others, as well as for components like pumps, valves, heat exchangers and pressure vessels.

While general national prosperity can speed nu-



clear progress, there are other important factors which will have significant influence on progress in this field both during 1957 and beyond.

### Foreign Interest

One of the stimulants to increased nuclear business for American firms during 1957 is the deep interest in nuclear research and development exhibited by countries all over the world. The United Nations Conference on the Peaceful Uses of Atomic Energy in Geneva, Switzerland, in August 1955 served to alert foreign scientists and engineers to the promises of the peaceful atom and led, directly or indirectly, to the initiation of dozens of nuclear research and development projects.

That interest during 1956 resulted in the sale of more than a dozen research reactors by American firms together with a great many other items of research equipment. This trend will continue for several years and should contribute both to the gross income of American nuclear firms and to continued development of their reactors and other atomic products. Only a substantial economic slump embracing many countries could restrict this sort of progress.

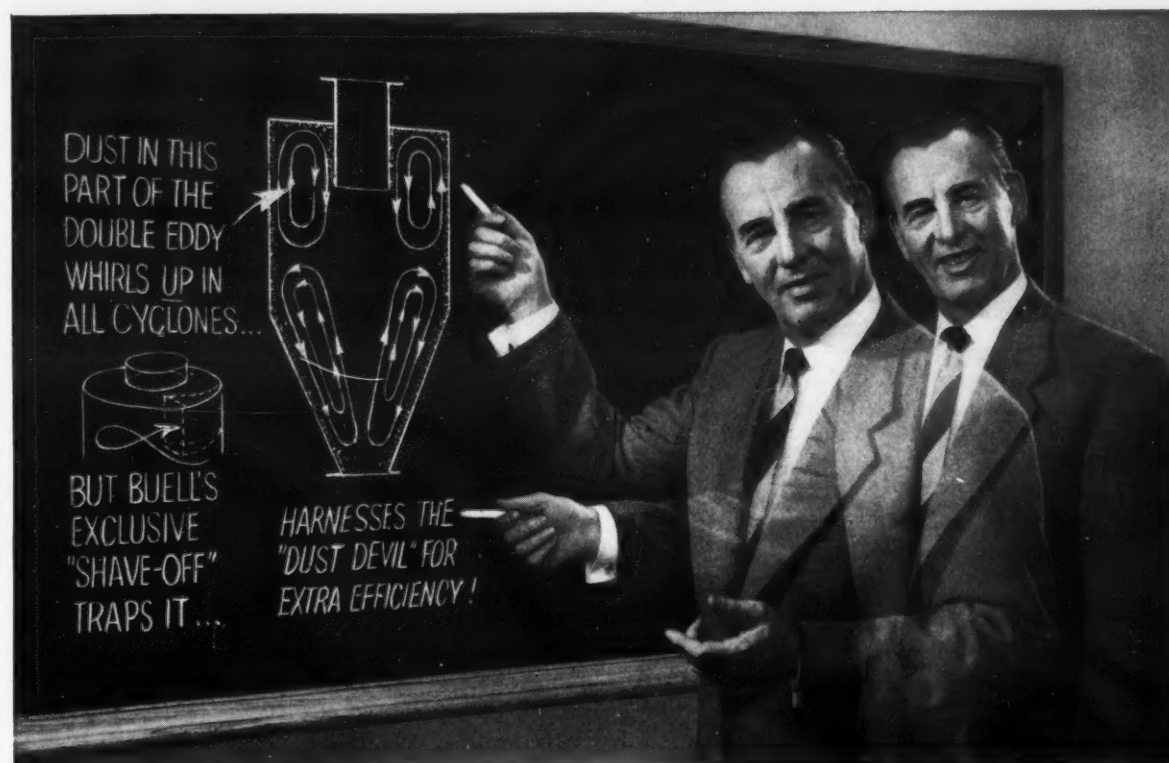
Foreign interest in power reactors for generation of electricity, ship propulsion and other purposes also is growing apace and will continue to do so during the coming year. While nuclear power plants of present design are expected to be economically competitive only in selected areas of the United States, they would now be economical in most countries of the world. This generally recognized fact is leading foreign companies, and foreign governments as well, to consider immediate construction of nuclear plants. Japan, India, Italy and Brazil, among others, are in this group. These investigations could, by the end of 1957, develop substantial reactor business for American firms, with probably more such orders to come in 1958.

### Obstacles to Activity Abroad

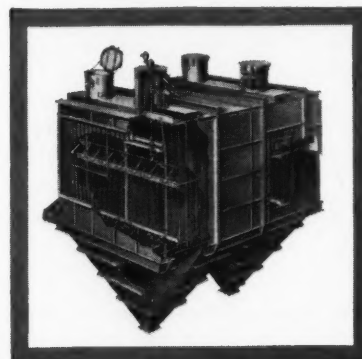
There are, however, some artificial factors which will influence the foreign reactor business obtained by American firms. In the first place, the negotiation and signature of more power reactor bilateral agreements between the United States government and foreign governments are needed before any firm can develop a world-wide reactor market. As 1957 began, there were only eight countries in which an American concern could sell a power reactor; three of those are in the British Commonwealth and, therefore, are hardly to be considered prime prospects. Of the interested nations noted above, not one yet possesses a power bilateral, although several are reported to be negotiating such agreements with the US. Completion of a large number of these documents

(Please turn to page 212)

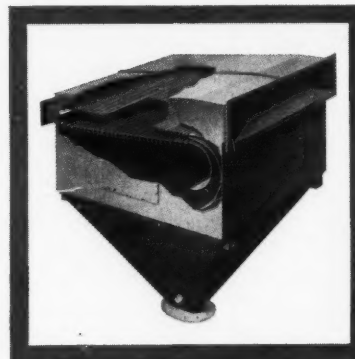
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CHEMICAL

*The Leaders Speak*

## 1957 and the Nation's Economy

RALPH E. BURGESS

*Economist*  
 American Cyanamid Company



The aggregate value of goods and services produced in this country (Gross National Product) attained new highs in both the first and second half of 1956, raising the year's total to about \$412 billion compared with \$391 billion in 1955. Approximately one-half of the 1956 gain of \$21 billion, however, represented the effect of price increases.

Thus the rise in real output from 1955 to 1956 was only about 2½ percent, or well below the average annual rate of increase for the post-war period. Three-fifths of the total dollar increase represented the rise in personal consumption expenditures. The greatest percentage gain (about 10 percent) appeared in gross private investment, which is customarily the most volatile element in the economy.

### *Slight Rise Seen*

In terms of the Gross National Product expressed in constant prices we look for a slight rise from the last half of 1956 through the first half of 1957 in GNP expressed in constant prices. In current prices, which would reflect continued inflation, the gains would be greater.

For the second half of 1957 it appears that similar comparisons will be somewhat more favorable in real terms and less favorable in current dollars, based upon some lessening of inflationary tendencies. For the year as a whole, we anticipate that Gross National Product may show a gain of one to three percent in real terms and four to six percent in dollars.

Industrial production — the output of the coun-

try's factories and mines — is a narrower indicator of economic activity than Gross National Product. As measured by the Federal Reserve Board index (1947-49 = 100) the physical volume of production was at an estimated level of 145 in October or one point above the previous peak of December, 1955, despite the serious adjustments business had to make in the interim. It is likely that total industrial output in 1956 is to exceed last year's by two percent.

Should business activity now move forward to still higher levels in 1957, as seems likely, the December, 1955 to July, 1956 decline of 5½ percent in total physical output will be recorded as the shortest and least severe interruption to date in the long upward post-war trend.

Manufacturers' heavy backlogs, a moderate level of stocks relative to current and prospective sales and a continued good volume of new orders sustained by a strong final demand — which has shown no sign of slackening in its rate of growth — means higher production, at least over the short-term. This would seem to be assured, assuming, of course, a continued favorable atmosphere for business here and abroad.

Looking further into the future — say to the last half of 1957 — it seems more likely that the continued strain on our national resources may finally reach a breaking point and that falling consumer demand will trigger a decline.

Thus, primarily the problem we face now is how to increase supplies sufficiently to meet the growing demands while at the same time maintaining stable prices in order to avoid an inflationary boom



followed by the customary bust.

A major sustaining force in 1956 — and one representing a potentially important future expansionary factor — has been private domestic and foreign investment. This rose by 10 percent from 1955 to 1956, the greatest percentage rise recorded for any segment of the national expenditures accounts.

Record new investment in plants and equipment more than offset a declining rate of inventory accumulation and smaller outlays of consumers on new housing. There is evidence that private investment should remain strong in the aggregate, at least through a large part of 1957.

Owing to a tremendous lift from industrial and commercial projects (up more than one-fifth) total expenditures on new construction reached a peak for 1956 despite a drop of nearly ten percent in outlays for residential buildings.

Rising costs of construction, which have mounted roughly five percent over the last year, were a factor in sustaining total expenditures in this area in the face of a decline in housing starts from 1.3 million in 1955 to around 1.1 million in 1956. Another factor was the trend toward building larger homes.

#### Catching up to Requirements

Available data suggest an optimistic outlook for a continuing expansion of expenditures on plants and equipment. It appears, however, that a major part of the indicated rise during the last half of 1956 was due to spending for equipment rather than for plants and in general this would indicate that industry is catching up with its plant requirements.

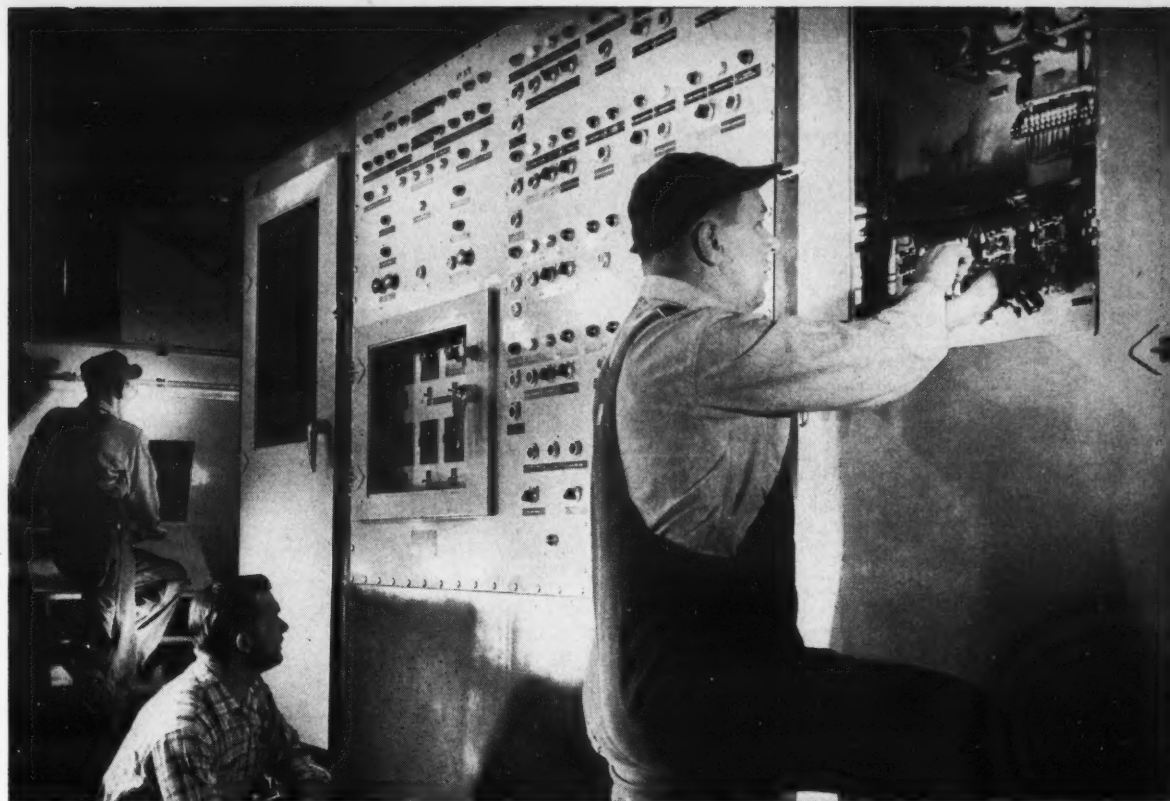
It also appears that construction of offices, as well as stores and suburban shopping centers, is rapidly catching up with demand. Faced with the need to reduce costs, businessmen are evidently mindful of the fact that prices of machinery have been rising at a much slower pace than wage rates.

One imponderable ahead, of course, is the possible deterrent that may arise from tight money conditions and the current squeeze on corporate earnings. The decline in housing starts has been attributed (particularly by the building industry) to the rise in interest rates.

It is true that tight money has affected the real estate business probably to a greater degree than any other. There is evidence that scarcity of mortgage credit under provisions calling for small down payments, long terms to maturity, and fixed interest rates of 4½ percent has been an important deterrent to residential building over the last year.

Assuming mortgage credit will be available (under more stringent terms) to a sufficient degree, it is reasonable to expect private non-farm housing

(Please turn to page 214)



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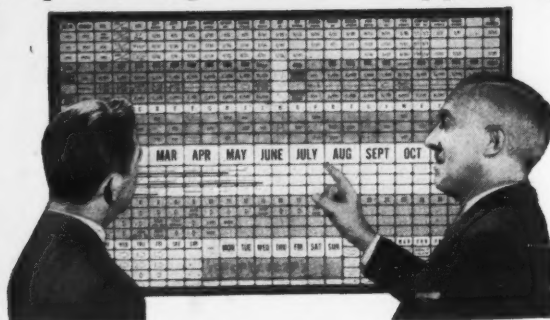
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PLASTICS

*The Leaders Speak*

**E. L. KROPSCOTT**

Manager of Molding Materials  
Plastics Department, Dow Chemical Company



## Development paths for plastics

Forecasting the future has been a favorite pastime of man since before the dawn of history. Many methods have been used to foretell coming events. There are pet ways of speculating on tomorrow's weather, the outcome of a football game or who's going to show in the fifth. To those of us in the plastics industry, however, a study of past happenings and development of trend lines seems to be the most logical way to approach a forecast of the future.

Those things that will have the most notable effect on the plastics industry in the coming year are already upon us . . . the materials and methods that we have today. Under the most favorable of conditions, the development of sizeable production in any plastic material takes at least three years. There is a methodical growth in expanding on a large-scale level, as materials generally are patterned according to present equipment. Notable changes do not occur in the plastics industry overnight . . . or even in one short year.

### A Decade of Growth

But let's first go back to 1946, a year when plastics were yet in their infancy, in order to pick up the impact of what has happened since that date. If the trade continues to change at the rate of the last 10 years, we can look for big things in the decade ahead.

In 1946 the industry was in the midst of trying to find peacetime uses for plastic materials. World War II had been a great stimulus in producing several new ones which showed considerable promise. Silicone molding materials were just being announced. Polyethylene, a high priority material during the war, was being promoted for peacetime uses. Several

other hopefuls did not survive.

In thermosetting resins, the types and grades which are most familiar today were fairly well described in 1946.

Polystyrene was being characterized as a rapidly growing thermoplastic and several types were being offered, all of which were in the general purpose category. The need for better toughness and improved moldability was definitely recognized. First applications were in refrigeration and coaxial cables. The rubber-modified polystyrenes had not yet become commercial products.

The controversy of hydraulic versus mechanical clamping injection molding machines was raging at that time. The need for faster and smaller machines was being expressed, as well as the trend toward larger machines. The debate of small gates versus large gates was just beginning.

Extrusion was growing fast. Pressure and temperature measuring devices for extrusion machines were being announced and methods of their use described. The blowing of plastic sheet was becoming a recognized method of fabrication. However, there was little talk about the use of vacuum to form plastic sheets. Plastic foams were already being described and foaming-in-place was being deemed a desirable and necessary technique.

Some of the materials, machinery and methods of fabrication being discussed in 1946 are now largely a reality in the plastics industry.

Today the plastics business is a major industry. It has a sales volume of over three and one-half billion dollars. The annual consumption of plastics is about 22 pounds per capita. We look to the future with

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The list of new materials today may not be quite as long as in 1946 but at least it is quite impressive. Included in new materials having promising growth potentials are the polypropylenes, the polyurethanes, the polyamides, epoxies and styrene copolymers. Of course, we should continue to mention some of the plastics which have made the industry the size it is today: the phenolics, the polystyrenes, the polyvinyl chlorides, the alkyd resins and polyethylene.

There are predictions that several materials will surpass the half billion pound per year production figure. These include phenolics, styrene molding materials, PVC, polyethylene, the alkyd resins and styrene and its copolymer resins.

#### New Facilities Needed

The job of producing these vast quantities of materials falls upon the chemical industry. In order to do this, new polymer and monomer facilities are needed and, in turn, the additional facilities to produce or purify the respective raw materials.

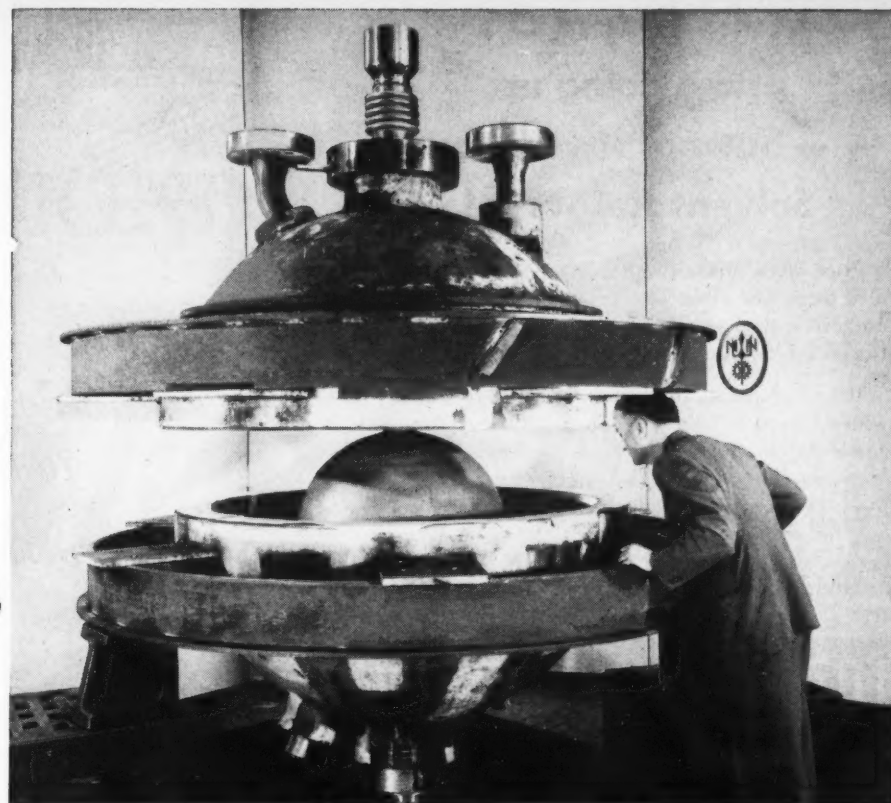
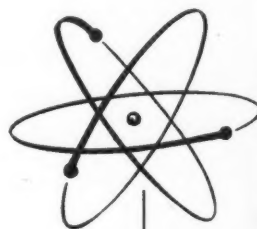
Major changes can be expected in the equipment used to convert plastics to finished products. Future developments will generally follow two paths. The first is refinement and improvement of present equipment. Completely automatic molding machines and continuous vacuum-forming techniques will be common practice in the industry. Specialized plastic equipment will be built for large-volume items, such as packaging and sub-assembly parts.

The second path in equipment changes is toward "technological break-throughs." A recent one is catalyst chemistry as described by Ziegler and Natta, and a second is radiation chemistry as applied to plastic materials. These new concepts point toward production of whole new families of plastic materials which may in turn displace some of existing plastics.

However, it is possible that their major uses will be found in new and yet undiscovered applications. Radiation chemistry appears to have utility not only in the synthesis of new materials but also in the post-treatment of plastics. The possibility of producing a material that molds easily, and which can then be upgraded by radiation to improve its heat distortion, its chemical resistance or rigidity, is most intriguing.

#### The Years Ahead

What about future applications for plastics? We have seen what 10 years can do in the use of plastics in the fields of housewares, toys, and refrigeration. Certainly today we have more knowledge about plastic materials and the ways to make them into finished parts than we did in 1946. With this background we should do a better job of engineering plastics to meet the proper applications in the years ahead. Major markets, such as packaging, transportation, housing, and road building are ready and waiting for correctly designed plastic materials.



**Assembly of zircaloy-2 core tank and pressure vessel for Homogeneous Reactor Experiment No. 2 (HRE-2).** The HRE-2 is a 5,000 KW plant designed for AEC by Union Carbide Nuclear Company. Newport News manufactured the 32" I.D. core vessel from 5/16" zircaloy-2, which involved

the development of new welding techniques. The pressure vessel of Type 347 stainless clad steel is 4.4" thick, with an inner diameter of 60". Newport News designed the expansion joint between inner and outer vessels, and also produced the unusual coil-cooled blast shield for the unit.

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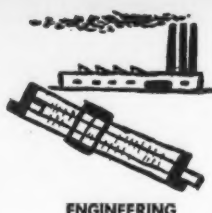
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The Leaders Speak

ENGINEERING

## Methodological trends — 1957's breadwinner

GRANVILLE M. READ

Chief Engineer

E. I. du Pont de Nemours & Co., Inc.



The growing acceptance of high speed digital computers in industry promises to be a powerful economic force. Use of statistical and mathematical concepts broadens not only the technological front in 1957, but the economic aspects of the business such as inventories, markets, sales, distribution, production, and accounting.

It is estimated the annual sales of high speed digital computers will approximate one-half billion dollars by the end of 1957. The use for this type of equipment in the chemical industry will be found chiefly on plants and products already in production, for products part way along the road to commercialization, and for products which show a low percentage return on invested capital.

Methodological concepts combine the use of statistical, mathematical, and analog and digital computer techniques. These concepts will find their broadest application when applied to research, process development, and business management. Examples in these three categories may serve to illustrate how traditional methods and procedures have been pushed into the background by these new techniques.

In research, for example, the methodological concept is facilitating immeasurably the investigations of chemical reactions in radically severe environments. To determine the effects of, say, super-temperatures and super-pressures, requires costly experimental equipment which must be operated under rigidly controlled conditions. However, through the use of mathematical models and analog and digital computers, a wide variety

of conditions can be evaluated readily. Not only can the behavior of the reactions be determined but optimum design specifications for the process equipment can be established. Then, during the pilot plant stage, the use of statistically designed operating conditions, coupled with computer analyzed data, speeds up the refinement of the process. The resulting commercial plant can then be designed for optimum relationships between productivity and investment, and placed in operation much earlier than could have been done under more conventional methods of research and process design.

But the methodological concept is not only confined to the areas of research just illustrated. It is rapidly gaining acceptance in all phases of research, including determination of reaction mechanisms, exploration of new molecular relationships, evaluation of alternate process paths, and specification of materials and equipment for new processes. Of greatest significance is that this concept conserves and gives more pertinent direction to the technical efforts of highly valuable research scientists. The saving in technical effort strengthens the research arm and reduces research costs. In this day of shortages of scientists and engineers, this is an important accomplishment.

In the process development area, the methodological concept is valuable in the analysis of existing processes for the purpose of improving yields and quality and boosting the percent return on invested capital. Most chemical processes involve many variables between which the interactions are

exceedingly complex, and in which their mutual relationships are not readily understood. These concepts have demonstrated their ability to trace intricate reactions from beginning to end. The knowledge gain pin-points those areas where intensive process development is needed, and enables engineering effort to be directed to those specific parts of the process where most significant improvement can be made.

An example may illustrate the importance of the concept to process development. In a new multi-stage continuous process, yields had been less than satisfactory during the several months following start-up. The product was in great demand so intensive effort was put forth to obtain the desired improvement. A task force of engineers, mathematicians, and statisticians attacked the problem according to the methodological concept. After a few months of effective team effort and the use of a large scale digital computer, the complex interactions between 17 variables were examined and new operating conditions were defined. With essentially no additional capital investment, yields were improved substantially; and, more important, new direction was given to additional process development work which resulted in further improvements in both yield and product quality. It is estimated that a two-year time advantage in process improvement was obtained and need for added investment for more capacity postponed.

Another use of the methodological concept in process development is the evaluation and "tuning up" of processes which have long been in operation and for which the return on investment is marginal. Statistical methods are used to modify operating conditions to obtain optimum balance between yield, quality, quantity, cost, and other economic factors. In addition to the profit advantage thus obtained, new insight is gained into process behavior which has led to radically new and less expensive processes. Each day sheds light toward technological progress.

In the research and development laboratories of the chemical industry in 1957, the impact of business conditions and technology will combine and pyramid. Fast-changing markets put huge premiums on time and money saved by statistical planning of experiments, by use of digital and analog computers to get data and evaluate alternates; by telescoping research and engineering design; by use of models instead of drawings for quicker agreement on details, faster estimating, earlier understanding by business and financial people, and speedier training of operating and maintenance personnel.

The Man of the Year in 1957 will not be a single individual but will be the composite of those research scientists, development engineers, and managers who are using modern mathematical, statistical, and computer techniques, combined with creative judgment and imaginative decision making to get practical answers.



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*The Leaders Speak*

## The paint industry views developments in the new year

J. M. THOMAS

*Vice President*  
Resins & Chemicals Division  
Jones-Dabney Company

Many exciting new scientific developments, some just being formulated, and others well developed, will result in a terrific impact on the paint and varnish industry during the year 1957.

This industry is actually relatively new as a truly chemical industry. Many individuals who first applied truly scientific techniques to what was, for many centuries, an art, are still active today. Therefore, many of the new technical approaches to problems confronted by the protective coatings industry are only now beginning to bear fruit.

The industry is becoming more aware of its important role in today's modern world. Its tremendous contribution to the American way of life is more than ever being recognized. The benefits of the color and protection provided by organic coatings, which are very low in cost relative to the total cost of the articles they beautify and protect, is a source of just pride to members of the industry.

The paint and varnish industry has been among the leaders in American industry in solving its problems through scientific research and development. The result has been new and improved protective coatings for both industry and the public. Some of the most important of these advances that will be felt during this year are related to the trade sales, maintenance, and industrial division of the industry.

### Trade Sales

The continued growth of emulsion or latex type paints will be the highlight of the year for trade-sales-type products. The new and improved types, namely PVA and acrylic, will undoubtedly continue to make inroads into the volume developed by the first entry



in this field, styrene/butadiene. The year will very likely see not only improvements in one or possibly all of these types, but also the possible introduction of still other types that will result in the consumer benefiting from further improvements in these "easy-to-use" coatings.

This overall picture points out the further advances that will be made in the synthetic materials which contain no natural products such as drying oils. The emulsion finishes will also continue to make further inroads into the areas of resistant-type floor and masonry coatings both for interior and exterior usage.

### Maintenance

Maintenance coatings, which are closely associated with trade sales by most industry members, will have their most spectacular development in the field of the new chemical-resistant coatings based on the epoxy resins. This year, we will undoubtedly see these materials come into their own as the answer to the terrific corrosion problem facing the growing chemical industry. Due to the excellent adhesion, toughness, durability, and chemical resistance of these epoxy resins, they bid well to be the

CHEMICAL PROCESSING

## chemical business

standard of the entire maintenance industry for coating surfaces exposed to corrosive conditions.

The isocyanates, a newcomer to this type application, will also receive consideration during this year. Already making strong headway as foams for industrial use, these will receive real attention as possible corrosion-resistant maintenance coatings.

### Other Industrial

The automotive section of the industrial finishes industry will proceed with four new developments which will see new systems being used during the year. These are the use of the epoxies as automotive primer vehicles; the introduction of new high gloss, non-drying alkyd/high melamine baking enamels for use on automobiles; and third, the use of entirely new type lacquers based on synthetics of the acrylic type. The fourth significant development will be the serious evaluation and possible adoption of primer systems using water instead of organic solvents as the application medium. Should this development prove successful, it will have terrific impact because it will eliminate any fire hazard.

Specific products that could well come into their own are the silicone and modified polyethylene. The new high polymers making these many improvements possible will continue to make headway during the year, and provide finishes that will adequately meet the demand for brighter colors, greater toughness, durability, and general performance.

### Sugar detergents to pilot stage

With initial process development at Foster D. Snell, Inc., nearly completed, pilot production of sucrose esters is expected early in 1957. Berkeley Chemical has been licensed by the Sugar Research Foundation to operate under the foundation's patent application. Research and development program at Berkeley will be carried on over next several months. Pilot runs have already been made at Snell.

Physical properties place sugar detergents in class by themselves. They are odorless, tasteless, non-toxic and non-irritating, and are solids. They are possibly the only efficient water-soluble detergents safe for human consumption. Being edible, sugar esters can be used in food industries for cleaning without introducing taste problems. They can also be used as dispersion agents in dehydrated food products and as emulsifying agents. In the pharmaceutical field esters can be used as surfactant additives to increase digestibility of fats for infants and aged persons. Suggestion has also been made that the esters will find use as emulsifiers for creams, lotions, toothpastes.

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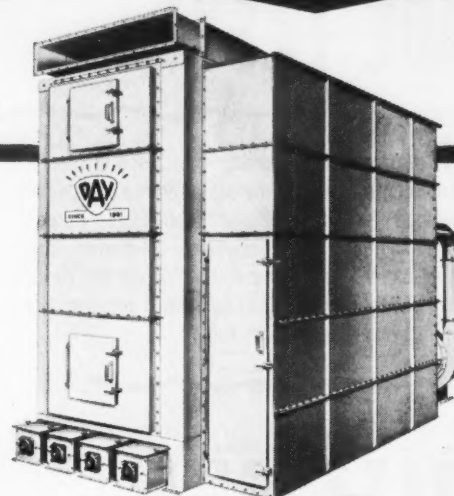
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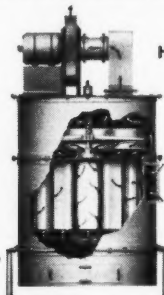


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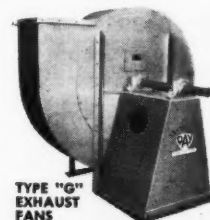
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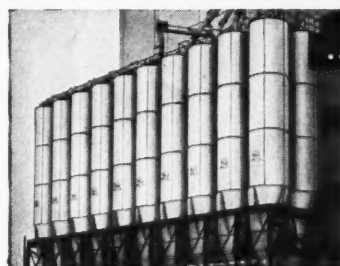
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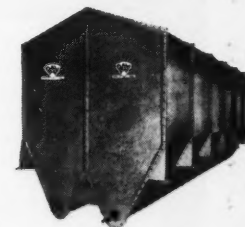
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CHEMICAL

## The Leaders Speak

**D. W. DRUMMOND**  
*Executive Vice President*  
Olin Mathieson Chemical Corporation



*Tight money, increased competition  
will affect chemical industries in 1957*

The economists seem to be unanimous in their opinion that 1957 will be another banner year for business.

In this kind of environment, and with a near-record volume of new chemical capacity due on stream during the twelve months, it would seem that sales of chemicals can hardly miss setting new highs.

It is difficult to generalize about an industry that makes several thousand different products for almost as many markets. The chemical industry is constantly undergoing its own "rolling adjustment". Individual manufacturers face the continual challenge of new competitive products, new producers, and changing conditions.

There are, however, a number of business factors that will affect all segments of the industry and all producers to some degree during the coming year. At least seven of these appear to be worthy of mention.

### Rising Costs

The inflationary spiral is with us again, and there seems little doubt that its effects will be felt throughout the year.

In those chemical product areas where capacity is already in excess of demand, higher costs are likely to mean profit squeezes until markets increase sufficiently to permit offsetting rises in selling prices. Where expansion is still in the planning stages, it will be necessary to re-evaluate individual projects in the light of higher prices for construction and materials.

Operating costs in all categories will come under closer scrutiny, and few producers will escape the need to concentrate on profit margin improvement. As a part of this stress on costs, more attention is going to have to be paid to research expenditures. This does not imply any de-emphasis of research. On the contrary, the need is for more effort in this area, but it is going to become increasingly important that we have competent yardsticks and controls to assure that we are getting the best possible return from our research dollars.

### New Construction

Industrial expansion generally is continuing at a high rate. Capital spending for chemicals and allied products was over \$1 billion in 1955 and rose to a record \$1.5 billion, or close to 7 percent of sales, in 1956. It must be recognized, however, that two to three years are required before this kind of spending begins to show returns. Therefore, the full impact profitwise of the 1955 and 1956 outlays will not be felt until 1958. In addition, start-up expenses often further defer realization of full potential.

There is no indication of any decrease in capital spending by the chemical industry. Studies based on plans of major companies point to an even greater rate of spending during the three years 1957-59. For these years the study indicates a growth in chemical capacity of 29 percent, or almost 10 percent a year.

This is an impressive figure but it is not a surprising one. Chemical production for almost half a century

## chemical business

has been growing twice as fast as industry as a whole. Projections of chemical needs indicate at least a continuation of this rate.

It is also well known that chemicals energize other industries. New chemical materials, improved materials, new applications of chemical methods, all act to stimulate developments outside of the chemical field which eventually result in broader markets for chemicals. Thus the present good health of the industry is itself a positive factor in support of its continued growth.

### Tight Money

So far, increased interest rates have had little effect on chemical expansion. Because most new chemical projects are soundly conceived ventures, money is still available without restrictions.

Costlier credit could, however, mean difficulties for some of the smaller users of chemicals where margins are narrow and for whom short term borrowing is necessary to carry on. Such a situation could show up on chemical suppliers' books as an increase in accounts receivable. There is always a strong temptation by buyers to use supplier credit as a substitute for borrowing when interest rates are rising. If demands become unreasonable, some tightening of credit privileges may be necessary during the year.

The rate at which new chemical capacity will be coming on stream in 1957 will mean keener competition in many branches of the industry.

Look, however, for more "competition at a price" rather than more "price competition". With the mounting pressures on profits, sellers will find themselves in a poor position to grant concessions which build volume at the expense of net return. Suppliers of bulk chemicals in particular will find it increasingly necessary to scrutinize every transaction — working back to net profit at the point of production — to make sure that proper margins are being maintained.

### Transportation

Expansion of industry is being matched by new developments in transportation services.

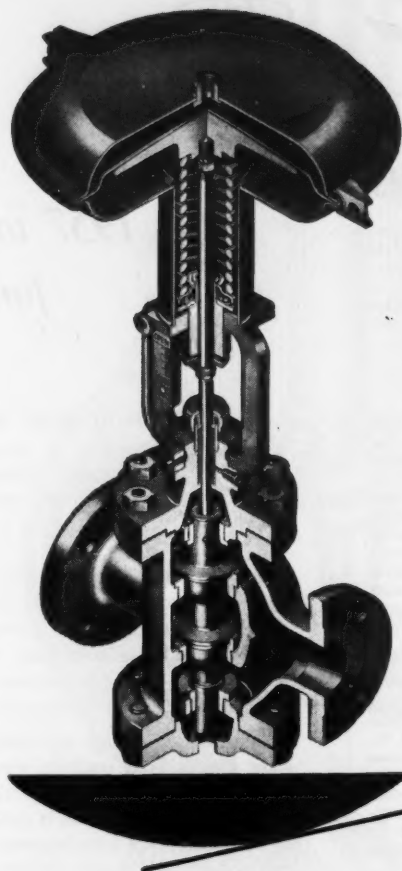
There is particular reason for optimism in the outlook for shipping by inland waterways. Superior barges, able to carry larger loads, are in the offing and will mean improved service and additional savings to shippers.

Overland transportation also is continuing to make strides with equipment better adapted to special products and services. Automatic handling and loading will see wider use in the chemical field.

We have reached the stage in the chemical industry where a good chemist can dream up important research projects faster than available technical manpower can reduce them to practice.

It appears that this shortage of technical personnel is going to be with us for quite awhile. We are

(Please turn to page 216)



## the valve that LIKES TO BE COMPARED

Is a  
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always required?

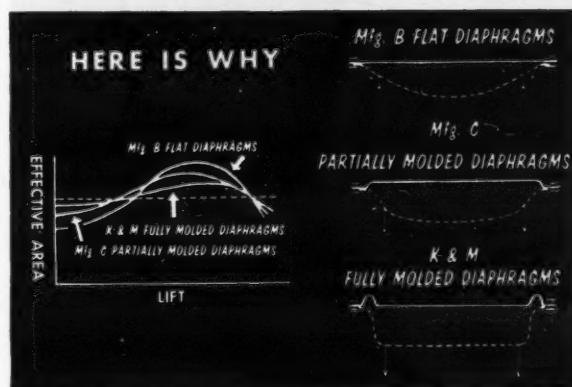
K & M provides 20-40% less positioning error. Often the need for a valve positioner is eliminated . . . because the K & M *fully* molded diaphragm gives the most constant effective diaphragm area.

K & M precision positioning also derives from long stem travel . . . lift that equals or exceeds any comparable valve . . . plus the highest power factor in the industry.

Behind it all lies one fact: K & M Control Valves are not *adapted* to high lift, they are *designed* for it. Throughout the entire range of valve travel . . . positioning is accurate and undistorted . . . control increments are finer with minimized positioning error.

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# News

Wherever CORROSION RESISTANCE is a Factor

## HAVEG PLASTICS SOLVE A MILLION CORROSION PROBLEMS



Haveg materials developed from special synthetic resins reinforced with selected chemically inert agents provide rugged strength and durability—plus exceptional resistance to corrosive chemicals and atmosphere—for a vast variety of industrial equipment.

### PROCESS AND STORAGE TANKS

New lightweight polyester glass tanks now augment the complete Haveg line of reinforced plastic tanks for every service. Manufactured and installed at costs considerably below those for lead or rubber-lined, stainless, and in some cases even mild steel constructions, the new polyester tanks offer additional saving in minimum steel requirements for support, ease of installation and maintenance-free service.



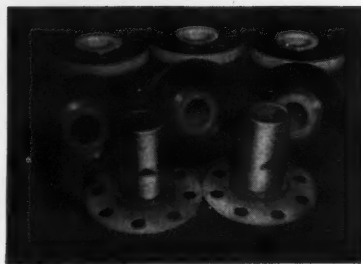
### FUME REMOVAL SYSTEMS

A complete Haveg fume removal system consisting of corrosion resistant duct, hoods, stacks and fittings offers the most efficient and economical installation for handling corrosive fumes and gases at atmospheres up to 350°F. Units are readily fabricated to accommodate the most intricate system layout and are available individually to replace deteriorated apparatus in existing systems.



### CORROSION RESISTANT PLASTIC CEMENTS

Haveg resin cements in a range of formulations to meet every chemical resistance requirement are readily prepared and worked for brick lining of process tanks, laying of chemical brick and tile floors, etc. Haveg cements are ready for use within 24 hours!



### Now—TEFLON\*

with all its superlative qualities has been added to the growing list of materials used by Haveg to manufacture corrosion resistant equipment.

It is now carried in stock as tubing, pipe and rod. Production now starting on "TEFLON" lined steel pipe, fittings, and vessels.

\*"TEFLON"—du Pont trade name for Tetrafluoroethylene resin.

Whatever your corrosion problem, Haveg research has developed the plastic to solve it at low cost. Haveg engineers are prepared to assist you in selecting the Haveg equipment to meet your requirements or to custom design

and engineer your process installations to assure you full advantage of Haveg's low cost production methods. Discuss your operations with a qualified Haveg representative . . . or write for Haveg Bulletin C-14 at no obligation.

H-608

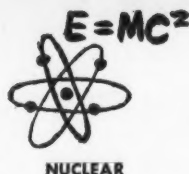
HAVEG PLASTICS OF TOMORROW SOLVE YOUR CORROSION PROBLEMS TODAY

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The Leaders Speak

## 1957 to be 'year of the atom' for private industry

DR. ROBERT A. CHARPIE

Assistant Director  
Oak Ridge National Laboratory  
Union Carbide Nuclear Company



Nuclear power on a large scale will finally come of age in 1957. We will see such large quantities of nuclear power made, that we shall begin to appreciate the problems and the prospects for nuclear power as a major factor in our future economy.

Great Britain is now operating their two giant Calder Hall reactors which constitute the largest power reactor installation in the world. The Soviet Union is on the threshold of operating two 100-megawatt stations of the pressurized water (PWR) type. The American PWR at Shippingport, Pennsylvania will begin operation late in the year at the 60-megawatt level. Thus we will have three substantial plants available for comparison.

It is hoped that from these comparisons, we can select the most reasonable avenues of reactor development for the next five year period. At the conclusion of this period, we shall surely see a very significant fraction of the total new electrical installations being nuclear in character.

A second important factor in the nuclear industry will be the long range growth pattern emerging this year from the operation of several of the advanced design reactor experiments. In particular, we can cite the experimental boiling water reactor at Argonne National Laboratory, the sodium graphite reactor at North American Aviation, and the homogeneous reactor test at Oak Ridge National Laboratory.

This year, we also expect to see the first successful operation of a high powered research reactor using uranium enriched to 20% U<sup>235</sup> content. The present plan is to load the MTR with this fuel in order to establish once and for all that the fissionable

material, which has been made available to the international pool by the US, can be used for high-powered test reactors.

Probably the most significant single event in the future of the nuclear power industry which takes place this year will be the formation of the International Atomic Energy Agency under the auspices of the General Assembly of the United Nations. Although it is clear that the impact of the agency is not primarily technical in character, it is certain to be a driving force in nuclear energy on a world-wide scale. If the agency increases the impact of nuclear energy on the world's economy in any way, it will be a boon to the American nuclear and chemical industries.

### Other Important Developments

We can expect that 1957 will also be the year for many other less dramatic but important nuclear events which will serve as a spur to the nuclear industry as a whole. In the first place, we anticipate the operation of the Army's package power reactor at Fort Belvoir, Virginia. This reactor, a prototype for operation at remote sites, is expected to be successful.

Its natural descendants will then constitute a substantial market in small reactors, associated gear, and components which can serve as a base for an industry in small reactors. We anticipate that 1957 will see the start of construction of a reactor for the irradiation of food. Because of technical complications, it is not certain whether food irradiation will be successful, but one thing is clear in view of the enormous importance of food in our economy: that if food irradiation is practical, it will provide a considerable growth factor for the nuclear industry.

Finally, the most important domestic trend in nuclear energy in 1957 will result from a change of attitude by American industry toward the nuclear energy business. We have seen the first privately owned nuclear feed materials plant. There will be an increased number of civilian application permits issued and a strong industrial program of privately financed nuclear energy research.

This is all to the good. To date, in my opinion, private industry on its own has not contributed significantly to the development of nuclear energy. By hiring key personnel away from important government nuclear energy projects, such as sub-critical size design groups, private industry has been a serious drag on nuclear energy as a whole.

Nineteen fifty-seven appears to me to be the year in which we will turn the corner so that government and industry together will be able to start on a vigorous program which will clearly reinforce the position of the United States as the world leader in development of nuclear energy for peaceful purposes.

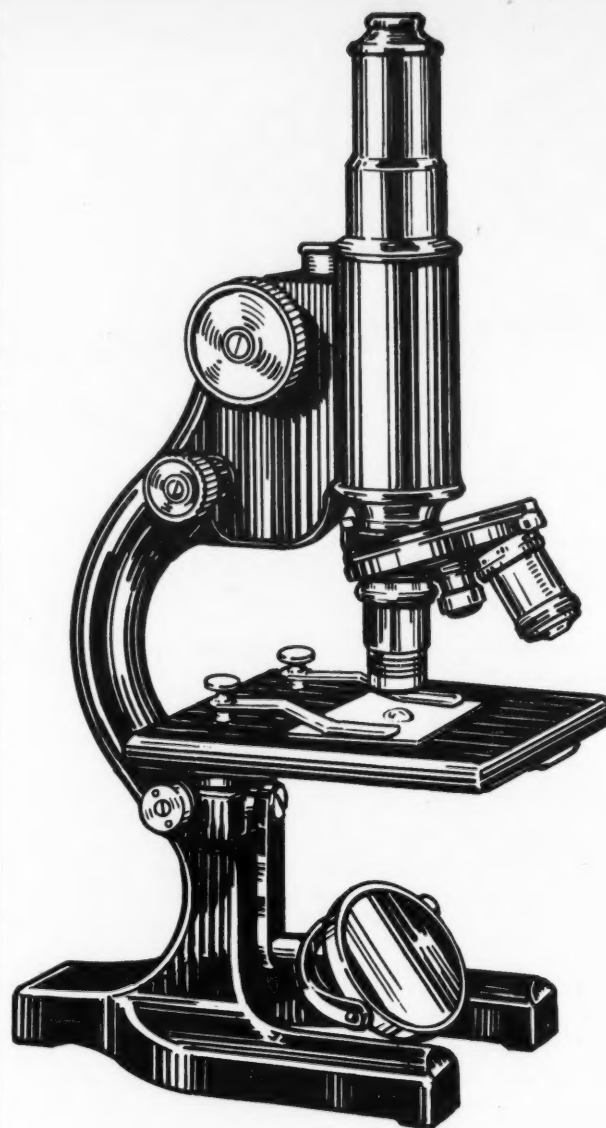
#### Nearly doubles oxygen production

New installations underway or soon to be started by Linde Air Products Company will almost double US oxygen producing facilities compared with oxygen capacity of only two years ago. About 30 installations boosting oxygen production capacity by nearly two billion cubic feet per month have been constructed or are contracted. Most of the installations are at or near steel mills.

#### Chemical Buyers

Chemical Buyers' Group of National Association of Purchasing Agents is holding fifth annual meeting in January, 1957.

First Gathering will be at Congress Hotel, Chicago, on Thursday, January 24th. Identical meeting will follow at Hotel Commodore, New York, on January 29th.



**In Water  
it's often  
what you can't see  
that hurts you!**

Anyone concerned with water-using equipment is perfectly aware that you can't see the dissolved minerals in ordinary water... the kind of water that can cause trouble and expense wherever it is used. This is just our way of reminding you that thousands of plants, institutions and other water users throughout the country are avoiding trouble and expense with Elgin Water Conditioning equipment.

Based upon scientific water analysis and a thorough study of your problem, Elgin will submit a complete proposal covering the type of water treating system which will give you the best and most economical service. This may mean simply ion-exchange softened water. Or, maybe analysis indicates need for dealkalization, neutralization or silica and CO<sub>2</sub> removal. At the other extreme, your operations may require water free of all minerals, alkalinity, acidity, gases... in short *chemically pure water* by means of deionizer equipment.

Whatever the case may be, Elgin equipment and Elgin water treating methods, plus Elgin experience and skill, can solve your problems... with maximum efficiency at minimum cost. Talk over your water problems with the Elgin representative in your vicinity who can put at your disposal all the skill and knowledge of Elgin's half-century of service. Or write us direct.



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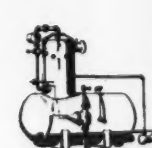
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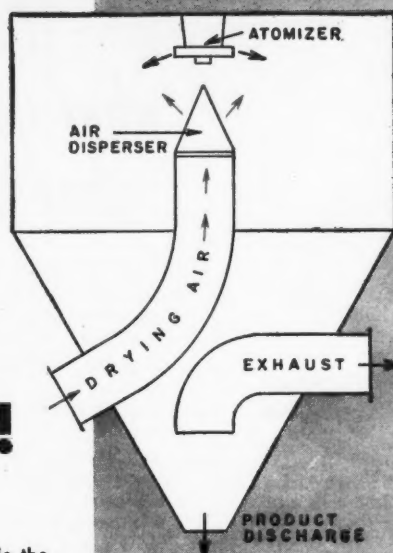
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Complete laboratory facilities, including three different sizes of spray dryers are available for research, testing or custom drying. Please write for Bulletins No. 226 and 232.



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Laboratories: Newark, New Jersey

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PLASTICS

The Leaders Speak

## Polyethylene faces a still brighter future

WILLIAM P. MARSH, Jr.  
Assistant General Manager  
U. S. Industrial Chemicals Co.



The most significant factor in the polyethylene picture during 1957 is the availability of resins with properties different from those available in the past.

The announcement of low-pressure polyethylene with high density and high stiffness has sparked the imagination of the plastics industry. But important as this is, it is not by itself the most significant development. A number of resin manufacturers, including U.S.I., have announced improvements in existing processes that will enable the high-pressure process to produce polyethylene with a wide density, or stiffness, range. This, coupled with the new low-pressure process, provides the clue to a really significant trend — the trend toward "tailor-making" each polyethylene resin for particular processing properties and for particular end-product characteristics.

Even during the last few years there have been many polyethylenes on the market — film-grade resins, injection-molding, blow-molding, electrical-grade resins, even resins with characteristics especially suited for small, medium, or large molded parts. And all of these variations have been available *before* the industry learned how to vary the resin density.

Now producers can vary the density of polyethylene resin as required, and with it such important properties as tensile strength, heat, distortion temperature, stiff-

ness, and permeability. Thus the producer has a new dimension to work with. He can provide all the resin variations that he did before, but at any density level. In 1957 the industry will have the ability to provide polyethylene resins for applications that the polyethylenes of 1956 could not satisfy.

### Trends

In our opinion, there will be no "revolution" in polyethylene as had been predicted when the industry first announced the higher density materials. Many processors will find that the resins they have been using in the past are still the "ideal" materials for their specific application. Others will be able to improve their products as medium-density resins are developed for them. Still others, who have been using more rigid thermoplastics, will find that the high-density polyethylenes can do a better job or do the same job at lower cost. And even more significant, product designers will have a new material to work with. New applications for polyethylene will arise where none had been before.

But while the most important factor in polyethylene is this controlled variability of properties, there are other trends in the field that, while less significant, are still important.

Polyethylene consumption in unsupported film, which today is responsible for approximately 60% of the market, will con-

tinue to rise as new applications within industrial and consumer markets are developed. Packaging applications of polyethylene-coated cellophane, aluminum foil, paperboard, kraft, and pouch paper will continue to grow during this year. The production of molded consumer items such as toys and housewares will expand further.

New industrial applications (in addition to the current uses in pipe, corrosion-resistant linings, flexible hose, acid- and solvent-resistant containers and electrical insulation) will continue to come to the fore. The use of additives and blending will provide resins with unique property combinations for other special applications.

These developments by producers, fabricators, and consumers will probably bring the one billion pounds per year production goal much closer than the oft-predicted 1960. Polyethylene will undoubtedly be the first plastic to achieve this goal.

#### Promise of lower spot price

... on zirconium (hafnium-free) comes from U. S. Industrial Chemicals Co., Division of National Distillers. Australian process has been optioned by U. S. I. to separate hafnium from zirconium chloride. Dr. Robert Hulse, chemical activities vice-president, says process is now in pilot plant stage.

If process proves commercially feasible, U. S. I. will exercise option to buy world-wide patent rights.

Promise of lower prices on zirconium is based on proposed elimination of costly extraction step in current and projected commercial production. U. S. I. thinks new prices on zirconium will be about one-third to one-half of current tab, depending on grade.

#### Joint petrochemical project

... between Commercial Solvents and Columbia Gas has been under extensive investigation for past several months. Companies now are going ahead with engineering and economic studies for the 40 to 50 million project.

While spokesmen are mum on most details, it is known that a jointly owned company will be organized to build and operate the plant for production of ethylene and derivatives. Natural gas owned or controlled by Columbia Gas in Appalachian area will be source of raw material. Tentative plant location is in Ohio Valley.

## HOW CAN YOU use this versatile material?

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## MAGNESIUM OXIDE

PELLET, POWDERED, OR GRANULAR FORM

#### AVAILABILITY

Immediate delivery in truck or carload quantities.

#### PURITY

Highest ever produced in process chemical quantities—Low Iron—Low Boron—Low Lime—Low Ignition Loss—Low Acid Insolubles.

#### PRICE

Lowest for this purity ever offered.

### HAVE YOU CONSIDERED MgO FOR THESE OR OTHER USES?

★ **ALKALI PRECIPITATIONS**—Since acid insolubles are less than 0.1%, precipitants prepared from International's MgO are consistently high in purity. Stoichiometric, laboratory-controlled, one-stage additions to an exact pH are possible. Incremental additions by trial and error in the plant are thus eliminated. Our MgO achieves gradual pH adjustment with maximum crystal growth, resulting in higher filtration and washing rates. Elevated temperatures and flocculating agents become unnecessary. Available MgO?—greater than 99.0%.

#### ★ FUSED REFRACTORIES

a) **ELECTRICAL INSULATION**—A nationally known research institute has proved the superiority of International's MgO. Initial resistance was shown to be consistently high. Life tests through 3600 hours proved insulation fused from International's MgO to have resistance measurement above other magnesias. Consider what this might mean in relation to rejects and failures.

b) **BASIC REFRACTORY BRICK**—Due to low

lime and silica impurities, magnesite-chrome refractories made with International's MgO show high resistance to slag erosion. Ease of furnace feeding makes our pellet form ideal for this use.

#### ★ BLENDING WITH OTHER MAGNESIAS

Adjustment of activity or bulk density with upgrade in purity is possible with International's unique MgO. Free flowing and slow hydration characteristics contribute to ease of handling.

#### LET'S TALK ABOUT QUALITY

Look at this typical analysis of just one of our high purity grades.

MgO —99.5	Al <sub>2</sub> O <sub>3</sub> —0.04
SiO <sub>2</sub> — 0.05	CaO —0.08
Fe <sub>2</sub> O <sub>3</sub> — 0.06	Na+K —0.05

Boron Range—10 ppm to 100 ppm B  
Powdered as fine as 90% minus 325 mesh

Technical data relative to the above are available upon request. Also for your experiments, we will furnish adequate samples of International's MgO in a grade suitable to your needs if you will indicate your area of interest.



potash division

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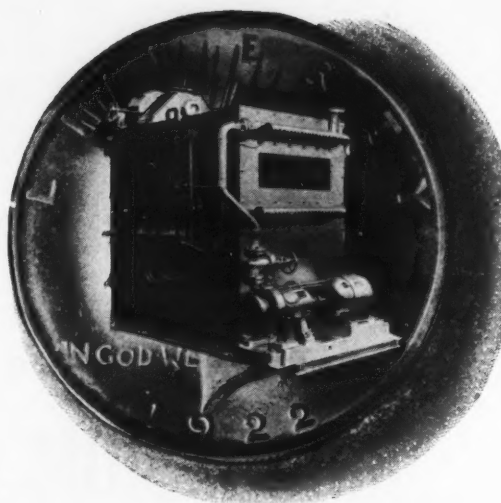


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*with* **International-LaMont**  
**Forced Recirculation**  
**Thermal Liquid Heaters**

Trouble-free process heat to 750°F. day after day, year after year at low cost. This proven assurance is the key to the unprecedented acceptance and use of International-LaMont Thermal Liquid Heaters and Dowtherm Vaporizers.

These dependable **Forced Recirculation** Heaters are designed specifically for this high temperature service... provide accurate temperature control  $\pm 2^\circ\text{F}$ . or less, and their high velocity circulation means highest heat absorption plus freedom from fluid decomposition. Available in standard capacities from 250,000 to 50,000,000 Btu per hour, International-LaMont Thermal Liquid Heaters and Dowtherm Vaporizers are supplied as package units complete with oil or gas burners and all controls.

Get the facts about **Forced Recirculation**, write for Bulletin TLH.



1886-1956

**THE INTERNATIONAL  
BOILER WORKS CO.**

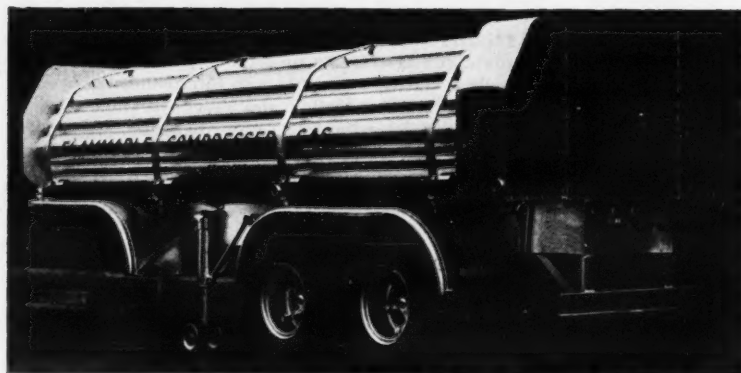
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## TAYLOR-WHARTON GAS TRANSPORTS



**multiply  
the usefulness  
of bulk storage**

If your operations require storage of compressed gases in bulk, it will pay you to put your storage facilities on wheels. The use of Taylor-Wharton Gas Transports enables you to move the supply to the point where it is needed at any particular time. Chemical, petrochemical, electronics and food processing companies operating their own gas producing plants, use these vehicles for inter-plant distribution of gases and for standby equipment.

Taylor-Wharton Gas Transports consist of specially constructed trailers in single and double axle models, mounted with a group of seamless steel storage pressure tubes made to ICC3A2400 specifications. The tubes are interconnected with valves and manifold to a common outlet in a weatherproof cabinet built on the rear of the trailer. Standard capacities range from 38,500 cu. ft. to 56,250 cu. ft. Other sizes as required.

Ask us for complete information, describing your requirements.



**TAYLOR-WHARTON CO.**  
Division of HARSCO CORPORATION

**Harrisburg 24,  
Pennsylvania**

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## Spotlight on People

3M promotes two in the industrial trades tape division... **Richard T. Flaherty** is supervisor for Scotchpak films, products control department, and **James B. Gergen** is made assistant manager for new products, research and business development department of the division.

**Arthur Komorowski** has been named production manager of the new acetylene chemical products plant of General Aniline & Film.

General Electric names **John M. Tome** to direct market research and product planning for company's chemical materials department.

At S. C. Johnson & Son, Inc., **A. F. Buckman** has been elevated to post of assistant research and development director.

**Dr. Edward F. Wagner**, a member of CHEMICAL PROCESSING's Editorial Advisory Board, has been appointed to the newly created position of manager of development for Witco Chemical Co.

**E. C. Sargent** is appointed president of Zirconium Corporation of America.



Sargent

At Union Carbide's Bakelite Division... **G. L. Pitzer** becomes vice-president of production, **C. W. Blount** moves up to vice-president of marketing, and **J. D. Benedito** is made vice-president of sales for Bakelite. And **R. K. Turner** has been appointed v-p of Carbide and Carbon Chemicals Co.

Dow's **Edgar C. Britton** has retired from position of director of the company's organic research lab, but will continue to serve as a research consultant on a company-wide basis. Also at Dow... **Leo B. Grant** has been elevated to newly created post of sales manager of the chemicals department. **James Day** will succeed Grant as manager of New York office.

Chemstrand creates new position of market research manager for the general sales division and names **Cloyce L. Purdom** to post. **James P. Vandervort** has been made assistant to president of Chemstrand.

Malayan Tin Bureau announces the appointment of **R. D. Coursen** as deputy director.

**Lawrence H. Flett**, formerly director, new products division and now consultant to National Aniline division of Allied Chemical, has been made an honorary member of Societe de Chimie Industrielle. Mr. Flett, president of the American section of the Societe, has been active in the group's affairs in this country for many years.

**Chalmer G. Kirkbride**, a former member of CHEMICAL PROCESSING's Editorial Advisory Board, has joined Sun Oil as executive director of research in patent and engineering department. Mr. Kirkbride was formerly president and board chairman at Houdry Process. And **Ted C. Stauffer** has been appointed director of Sun's foreign operations.



Kirkbride

American Cyanamid announced **Dr. Eugene Allen's** appointment as group leader of Bound Brook Laboratories' dyes research section.

New v-p's at American Mineral Spirits Company . . . **John A. Bartlett**, senior vice president; **John J. Buckley**, vice president in charge of fuel oil department; **John E. Capizzano**, vice president in charge of Eastern sales; and **Karl F. Gilothe**, vice president in charge of Midwestern sales.

**Albert G. Ruff Jr.** has been appointed manufacturing superintendent at American Viscose Corporation's Marcus Hook plant, while **Dr. John A. Yourtee** has been made technical superintendent.

News from U. S. Industrial Chemicals . . . **James G. Couch** is new manager of production department's engineering section, and **Alden R. Ludlow Jr.** is named director of sales.

With the promotion of three members of Archer-Daniels-Midland's research staff, **Marvin W. Formo** and **Alexander Olotka** become new assistant research directors, while **Louis I. Hansen** is made senior research associate.

Ferro Chemical appoints **Charles H. Fuchsman** director of development.

New sales manager of Furane Plastics' coatings division is **J. C. de Graaf**.

IS YOUR CONVEYING SYSTEM  
STAGGERING?



## the F-H Airslide®

can stabilize your  
conveying operation

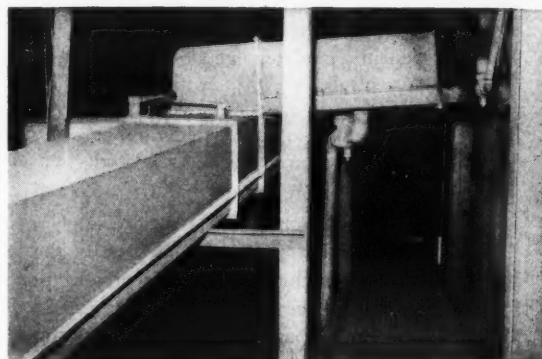
The phenomenal costs and waste that result from outdated and antiquated conveying systems can be, and have been, reduced to a gratifying minimum when the Fuller-Huron Airslide fluidizing conveyor comes into the picture.

The Airslide's record for low maintenance, high-volume conveying of dry, fine materials is outstanding wherever it is used . . . its operational benefits are substantial.

Low-pressure air is introduced into materials like alumina, phosphate, silica flour, cement, flour, filler dusts and many others, through a porous fabric, causing the material to flow in the upper section of the inclined Airslide, the degree of incline depending on the material to be conveyed. Further, the F-H Airslide can be used singly or in combination with other Fuller conveying systems, such as the Airveyor® or Fuller-Kinyon system.

Singly, or in combination with other Fuller conveying systems, you're bound to save more with the Airslide. The first step toward this goal is to call on Fuller. We'll be happy to provide you with details as well as a "no-obligation" example of how the Airslide can do your present conveying job better.

Write, right away, for descriptive Airslide literature.



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When inquiring check 1069 opposite last page



Production of Class A (medium duty) electric motors and generators reached a staggering 60 million units last year, and estimates say it will be higher this year.

The heart of these units is the electromagnetic coils of insulated wire. These are also an important part of transformers and electronic equipment.

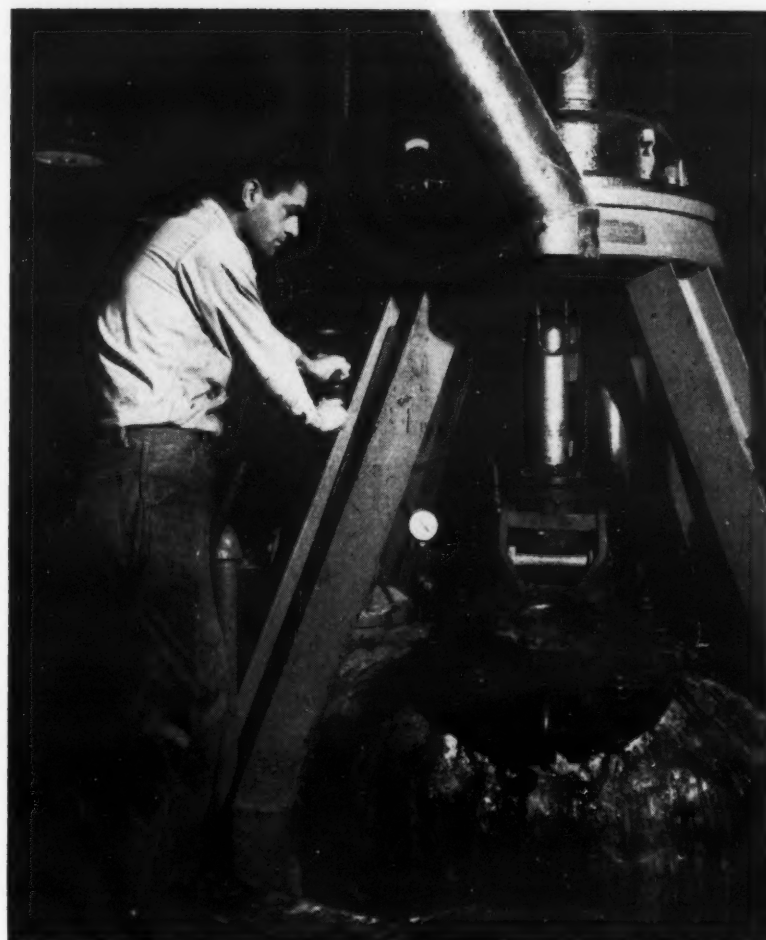
Here's the story of a development in wire enamels for this type of service which are resulting in substantial cost savings to makers of electromagnetic coils. It's the story of the development of —

## URETHANE COATINGS FOR WIRE INSULATION

FRANK E. McELROY, Assistant Editor  
with J. W. McHUGH, Vice President  
Schenectady Varnish Co., Inc.  
Schenectady, N. Y.

Joseph Weir McHugh, whose team has brought urethane wire varnishes to successful commercial development in this country, joined Schenectady Varnish in 1927, soon after graduating from University of Illinois. Working in the development, sales, and production departments, he was appointed to vice president in 1945. During the war, he was on leave to Washington — a lieutenant colonel in charge of chemical requirements of the Ordnance Department.

Weir also shoulders community responsibilities. He has been chairman of the Schenectady Red Cross, participates in Chamber of Commerce and Community Chest activities, and is a leader in Boy Scout work.



Urethane enamels are made in this glass-lined reactor

Photos by CP Staff

**Problem:** Wires used to wind electromagnetic coils for motors, transformers, and other electrical equipment, must be permanently insulated one from another. Although this insulation must withstand the internal heat generated, it must melt at a low enough temperature to make soldering of wire ends easy and effective. Otherwise production costs go up.

Wire insulation must be easy to apply. After curing, it must resist the abrasion of the coil-winding machines and the action of organic solvents in the final impregnating dip used to bind the coil and protect it from moisture.

Big cost savings can be made in the coil-winding operation, if certain problems can be

overcome. Here's what the manufacturer tries to do:

- 1) Hold solder as close as possible above melting temperature (which is above 400°F, roughly). If too hot, toxic tin vapors are given off and are hazardous to the operators. Also, the working area becomes too hot for efficient operation.
- 2) He tries to use a wire enamel that may be easily applied with his present coating equipment and still give good performance when in use.
- 3) He wants the enamel on the wire to melt quickly away when dipped in the solder bath. If the enamel is too high-melting or infusible, it must be stripped or buffed off,

requiring a separate operation.

4) Enamel must be economical.

**Solution:** A number of enamel formulations have been used throughout the years. Although they had good physical properties, they melted at temperatures above 800° or 900°F which caused production problems.

About five years ago, Schenectady Varnish began experimenting with a then-new German development: urethane wire enamels.

During this time, Schenectady has experimented with over 1000 formulations. Out of this vast developmental program has emerged a number of special formulations that can satisfy specific end uses and can especially suit an individual enameler's coating, heating oven, and coil-winding facilities.

Being one of the leaders in this field, Schenectady is hush-hush on revealing any specific formulations. Company is willing to say, however, that to develop maximum properties in an enamel, these ingredients are used to greater or less degrees.

A urethane from Mondur S and Multron R-2. These are trade names for an isocyanate derivative and a polyester respectively

Polyvinyl acetal resins

Phenol-formaldehyde resin

Aromatic solvents

A glass-lined reactor is used for processing, as shown in the photograph.

**Results:** The use of urethane wire enamels permits solder pot temperatures as low as 680°F, giving quick and easy soldering, reducing labor costs. By tailoring specific formulations to end-use properties desired, these enamels are giving a very satisfactory performance.

Tests that are representative of actual use conditions show the superior properties of urethane enamels. For example: Film tests show urethane enamels have about six times more abrasion resistance than conventional present-day enamels. When immersed in boiling xylol, the common thinning solvent for final coil-impregnating varnishes, urethanes are also superior.

Successful use in insulating wire enamels suggests that other satisfactory applications for urethane coatings may develop. Urethanes impart corrosion resistance, water resistance, fast drying properties, adhesion, and hardness characteristics. These benefits are recognized in Germany where the compounds are used extensively in protective coatings for chemical plants. A similar development is underway in this country.

Now that isocyanate prices are dropping, the urethane picture is looking even more attractive. It appears that we're at the beginning of a new

(Please turn to next page)



The proof is piling up!

## Isophthalic Based House Paints are Vastly Superior

Exterior house paints based on Isophthalic—

**have uniform through-dry—no paint wrinkling**  
Oronite's extensive testing, plus results by leading resin manufacturers, prove Isophthalic greatly superior to other materials in this regard.

**have faster drying properties**  
The higher, more uniform molecular weights give a dry film — quicker.

**have practically no yellowing in light tints**  
With Isophthalic, oils can be used which greatly reduce the amount of normal paint yellowing.

**can be manufactured at lower cost**  
Manufacturing costs can be reduced because more low-cost oils can be used.

**have mildew resistance**  
This quality appears to result from less unattached fatty acids present.

**have outstanding flexibility characteristics**  
At longer oil lengths greater flexibility results from higher proportion of flexible fatty acids in the molecule.

**have better color retention**  
Closer bonding of pigment particles give more uniform color appearance after application.

Resin and paint manufacturers can now offer new and improved products with Oronite's new, advanced raw material — Isophthalic. Contact any Oronite office for complete information—or ask your resin or paint manufacturer about Isophthalic.



### ORONITE CHEMICAL COMPANY

EXECUTIVE OFFICES: 200 Bush Street, San Francisco 20, California

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20 North Wacker Drive, Chicago 6, Illinois 714 W. Olympic Blvd., Los Angeles 15, Calif.  
Mercantile Securities Bldg., Dallas 1, Texas 450 Mission Street, San Francisco 5, Calif.

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4021

When inquiring check 1070 opposite last page



# Mathieson TRIETHANOLAMINE is there

...in the quantity and quality you specify and shipped to match your operating requirements.

Produced in Brandenburg, Kentucky, from ammonia and ethylene oxide of our own manufacture, Mathieson Ethanolamines are shipped in tank car, tank truck, and drum lots. Local stocks are available in important industrial areas. Write for technical information and samples.

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better  
shampoos



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INDUSTRIAL CHEMICALS DIVISION • BALTIMORE 3, MD.



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**ORGANICS:** Ethylene Oxide • Ethylene Glycols • Polyethylene Glycols • Glycol Ether Solvents • Ethylene Dichloride • Dichloroethylene • Formaldehyde • Methanol • Sodium Methylate • Hexamine • Ethylene Diamine • Polyamines • Ethanolamines • Trichlorophenol • Surfactants

When inquiring check 1071 opposite last page

## CHEMICAL MATERIALS

### Urethane Coatings

(Continued from preceding page)

revolution in the coatings industry.

(Mondur S and Multron R-2 are products of Mobay Chemical Co., Dept. CP, St. Louis 4, Mo. . . . or for more information check 1072 on form opposite last page.)

(Isomelt urethane enamels for wire are products of Schenectady Varnish Co., Inc., Dept. CP, PO Box 1046, Schenectady 1, N.Y. . . . or for more information check 1073 opposite last page.)

### Newsletter tells advantages of vinylfoam

Advantages and versatility of vinylfoam, as well as a listing of physical properties, are covered in four-page newsletter from manufacturer. List of products made of vinylfoam is also included.

Vinylfoam newsletter is issued by Elastomer Chemical Corporation, Dept. CP, 212 Wright St., Newark 5, N. J. Check 1074 opposite last page.

### Compares heat and chemical resistance of many fibers

Two detailed bulletins, one of eight pages and the other of 28 pages, compare heat resistance and chemical resistance of many synthetic and natural fibers. The table below is representative of the many found in these technical data bulletins.

#### Various exposures in organic solvents

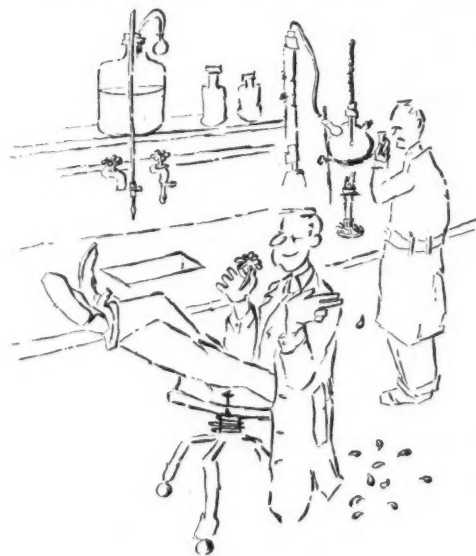
	Acetate	"Dacron" Polyester Fiber	Nylon
	75-24 Br.	220-50 5100	840-140 300
<b>STRENGTH RETAINED, %</b>			
No Exposure	100 (6)	100 (10)	100 (2)
100% Acetone 70°F. 1000 Hrs.	A	94 (19)	88 (12)
100% Amyl Alcohol (n) 70°F. 1000 Hrs.	95 (13)	93 (18)	88 (20)
100% Benzene 70°F. 1000 Hrs.	91 (11)	91 (22)	89 (12)
100% Carbon Disulfide 70°F. 1000 Hrs.	90 (13)	91 (23)	91 (14)
100% Carbon Tetrachloride 70°F. 1000 Hrs.	102 (9)	90 (19)	85 (13)
100% Chloroform 70°F. 1000 Hrs.	A	87 (16)	95 (12)
100% Ether 70°F. 1000 Hrs.	88 (7)	92 (14)	90 (12)
100% Ethyl Alcohol 70°F. 1000 Hrs.	98 (9)	95 (21)	87 (13)
100% Ethyl Acetate 70°F. 1000 Hrs.	A	93 (17)	88 (10)
100% Methyl Alcohol 70°F. 1000 Hrs.	99 (9)	90 (21)	85 (13)
100% Tetrachloroethane 70°F. 1000 Hrs.	D	87 (21)	85 (16)
<b>TOUGHNESS RETAINED, %</b>			
No Exposure	100	100	100
100% Acetone 70°F. 1000 Hrs.	A	81	62
100% Amyl Alcohol (n) 70°F. 1000 Hrs.	132	77	61
100% Benzene 70°F. 1000 Hrs.	113	74	59
100% Carbon Disulfide 70°F. 1000 Hrs.	88	74	70
100% Carbon Tetrachloride 70°F. 1000 Hrs.	149	77	53
100% Chloroform 70°F. 1000 Hrs.	A	116	64
100% Ether 70°F. 1000 Hrs.	85	73	58
100% Ethyl Alcohol 70°F. 1000 Hrs.	158	85	56
100% Ethyl Acetate 70°F. 1000 Hrs.	A	83	56
100% Methyl Alcohol 70°F. 1000 Hrs.	159	77	55
100% Tetrachloroethane 70°F. 1000 Hrs.	D	134	52

4545

"Orlon" Acrylic Fiber	"Orlon" Acrylic Fiber	Rayon	Cotton	Silk	Wool
100-40 81	3 dpf 42 Tow	1650 720-258	Upland Delta	20/22A Japan	Aus. M. Fine
100 (8)	100 (13)	100 (23)	100 (48)	100 (27)	100 (44)
94 (19)	109 (13)	99 (10)	85 (50)	106 (21)	74 (43)
95 (17)	101 (10)	94 (13)	106 (48)	103 (22)	88 (31)
101 (10)	103 (7)	92 (12)	101 (36)	93 (34)	106 (27)
84 (18)	98 (14)	87 (19)	91 (51)	107 (21)	58 (38)
98 (11)	107 (13)	93 (13)	89 (52)	91 (33)	63 (44)
93 (11)	100 (10)	91 (14)	88 (66)	105 (23)	96 (33)
93 (26)	110 (15)	95 (10)	79 (53)	108 (30)	51 (39)
95 (13)	103 (15)	91 (10)	98 (55)	101 (20)	59 (56)
95 (13)	99 (13)	89 (11)	93 (44)	101 (21)	59 (44)
99 (12)	104 (7)	92 (14)	88 (56)	110 (39)	89 (42)
91 (17)	104 (11)	95 (12)	89 (46)	102 (23)	83 (30)
100	100	100	100	100	100
93	101	79	70	102	57
94	89	68	90	82	71
103	96	66	80	113	110
79	85	62	80	119	39
9	92	75	90	91	31
90	91	76	70	104	62
90	98	74	60	100	25
95	98	61	70	95	48
86	92	61	90	80	36
103	97	74	73	108	75
90	95	80	70	70	85

A—Dissolved B—Fused Together  
C—Powdery Residue D—Degraded (Brittle)

Bul X-56 "Comparative Heat Resistance of Fibers," and Bul X-48 "Comparative Chemical Resistance of Fibers" are issued by Textile Fibers Dept., E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Del. When inquiring check 1075 opp. last page.



"... copper ... iron ... nickel ... tin ...  
copper ... iron ... nickel ..."

Thanks to J. W. Hambleton, Devoe & Reynolds Co.,  
Inc., Alhambra, Calif.

# Have you tried MICRO-CEL<sup>®</sup>

- to absorb liquids
- to provide bulk
- to prevent caking
- to control viscosity
- to extend pigments
- to aid suspension
- to reduce surface sheen

## New Johns-Manville mineral filler can help you improve products and cut costs

Want to absorb liquids or control viscosity? Try *Micro-Cel*—it absorbs up to 6 times its weight in water, remains a free-flowing powder even after absorbing twice its weight in liquids.

Want to bulk up your compound for better control of package density? Try *Micro-Cel*—a cubic foot weighs as little as 5 pounds.

Want to prevent caking? Try *Micro-Cel*—its high absorption works wonders in controlling deliquescent products.

Want to extend pigments or reduce surface sheen? Try *Micro-Cel*—it combines fine particle size, large surface area and inertness with high absorption suggesting many applications.

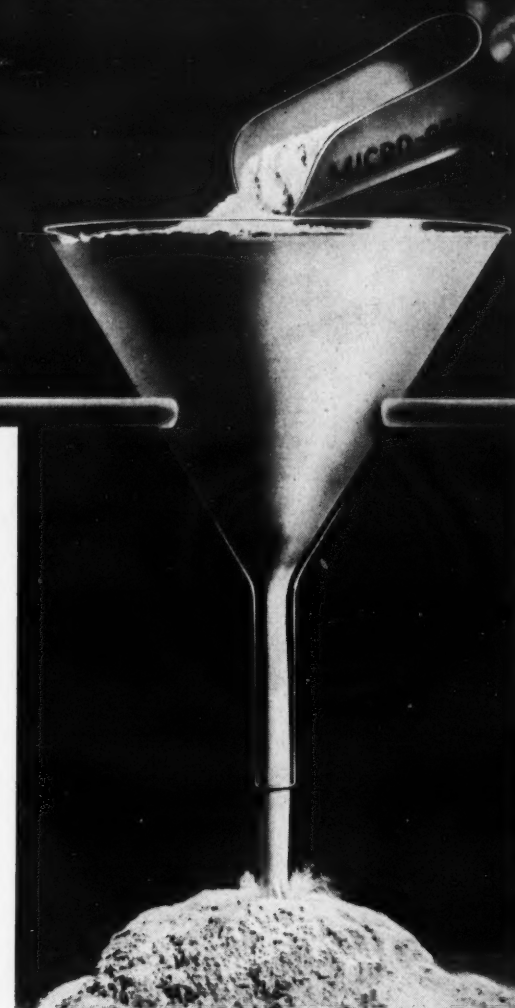
Want to assure better suspension of heavy solids? Try *Micro-Cel*—its particle size, as low as .02 micron, provides uniform dispersion and blending.

*Micro-Cel* is a brand-new line of synthetic calcium silicates produced by combining lime with diatomaceous silica under carefully controlled conditions. Its unique combination of properties has already brought important benefits and savings to many processors. Maybe you will be next. Just mail coupon for further information, samples and technical assistance.



## Johns-Manville MICRO-CEL

SYNTHETIC CALCIUM SILICATES  
A PRODUCT OF THE CELITE DIVISION



The Powder That Flows Like a Liquid—*Micro-Cel*, latest development of Johns-Manville Research, will greatly improve the flowability of many products.

Johns-Manville, Box 14, New York 16, N. Y.  
In Canada: Port Credit, Ontario.

Please send ☐ additional data ☐ samples of *Micro-Cel*  
I am interested in formulating the following products:

☐ Please have local representative contact me

Name \_\_\_\_\_ Position \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

When inquiring check 1076 opposite last page



# LITHIUM METAL

by the GRAM

or TON

## Is your research specialty here?

The diverse physical properties and chemical reactions of lithium metal make it a uniquely valuable research tool. Consider these provocative uses:

- Alkyl- and aryl-lithium compounds, which are prepared from lithium metal, find wide application in synthetic organic chemistry. Use of methyl lithium in the preparation of synthetic Vitamin A is a typical example.
- Lithium metal as a direct reducing agent now suggests an interesting potential.
- The polymerization of isoprene to "natural" rubber thru the catalytic medium of lithium metal dispersions is a new development.
- The military and peacetime uses of lithium metal in the field of heat transfer show great promise. Based on its low density, high heat capacity and high heat of fusion, lithium has no equal as a liquid metal coolant.
- Lithium metal is the starting material for the production of lithium hydride and, in turn, lithium amide and lithium aluminum hydride.
- Rocket and guided missile propellants utilize metallic "super-fuels." Many rely on complex compounds containing lithium metal or hydride. The key: lithium's tremendous reactivity.

Put lithium to work for you. Our banks of electrolytic cells can supply experimental grams or commercial tons of this admirably versatile metal. Write for details.

*... trends ahead in industrial applications for lithium*



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PROCESSORS OF LITHIUM METAL • METAL DISPERSIONS • METAL DERIVATIVES: Amide • Hydride • Nitride • SALTS: Bromide • Carbonate • Chloride • Hydroxide • SPECIAL COMPOUNDS: Aluminate • Borate • Borosilicate • Cobaltite • Manganite • Molybdate • Silicate • Titanate • Zirconate • Zirconium Silicate

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When inquiring check 1077 opposite last page

## CHEMICAL MATERIALS

### ***Finds powerful herbicide for eradicating Canada thistle . . .***

amino triazole gives better than 90% control

**Uses:** An agricultural chemical for control of Canada thistle.

**Features:** Weed killer gives 90% (or better) control with one spray application.

**Description:** Amino triazole is applied with one spray application after harvest. Spot treatment in spring kills any plant which might survive fall application. Herbicide kills by interfering with plant's manufacture of chlorophyll. It is also effective against quack grass, poison ivy, poison oak, cattails, and tules. It should not be applied directly to crops.

(Amino Triazole Weedkiller is a product of Agricultural Chemicals Div., American Cyanamid Co., Dept. CP, 30 Rockefeller Plaza, New York 20, N.Y. . . . or for more information check 1078 on form opposite last page.)

### ***High-purity methyl chavicol in commercial quantities for perfumes, flavors . . .***

now produced in US from domestic materials

**Uses:** In compounding odor and flavors and in the essential oil industry.

**Features:** Product has over 95% purity and has excellent odor characteristics. It is produced in the US from domestic raw materials.

**Description:** Methyl chavicol, also known as estragole, has heretofore not been produced in our country from domestic materials. It is now available in packaged quantities of 8, 40, and 440 pounds.

(Methyl chavicol is a product of Southern Chemical Div., The Glidden Company, Dept. CP, PO Box 389, Jacksonville 1, Florida . . . or for more information check 1079 on form which is located opposite last page.)

### ***Reports on boron polymers***

Report of an Air Force-sponsored investigation of boron polymers as thermally stable elastomers and plastics has been released in three parts: PB-111689 @ \$1.50, PB-111892 @ \$2.25, and PB-121374 @ \$1.25.

Reports have 58, 85, and 47 pages respectively, and can be obtained from Office of Technical Services, US Dept. of Commerce, Washington 25, D.C.

## CHEMICAL MATERIALS

### Radiation shields from epoxy . . .

it's easy to make lab-scale shields of unusual shape

**Uses:** Is intended for casting radiation shields.

**Features:** Resin is especially useful to the lab technician faced with the responsibility of preparing radiation shields of unusual configurations at short notice. Material can be cast into rectangular shielding blocks or complicated shapes such as shields about valve bodies, pipe fittings.

**Description:** Filled-epoxy resins, set rapidly at room temp, forming a hard, stable mass. High density, plastic arrests alpha and beta radiation, and offers substantial resistance to gamma radiation depending upon total thickness. Resin sets at room temperature.

(Epocast 11-C is a product of Furane Plastics, Inc., Dept. CP, 4516 Brazil St., Los Angeles 39, Calif. . . . or for more information check 1080 on form opposite last page.)

### Here's an "oldie" that has gone commercial

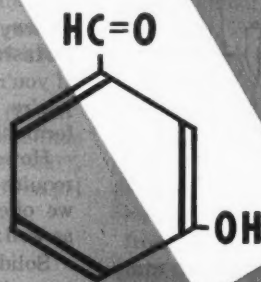
Methyl *p*-toluate is now available in commercial quantities. Although known to chemists for years, this is the first commercial offering. Possible uses may lie in the fields of essential oils, insecticides, and pharmaceuticals. A tech grade, it is white, crystalline, and melts at 34°C to a clear, mobile liquid. It has an aromatic odor.

(Methyl *p*-toluate is a product of Hercules Powder Co., Inc., Dept. CP, Wilmington 99, Del. . . . or for more information check 1081 on form opposite last page.)

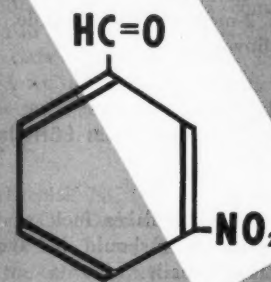
For more information on product at right, specify 1082 . . . see information request blank opposite last page.

## NATIONAL ANILINE PRESENTS 2-Reactive Meta-Substituted Benzaldehydes

### meta HYDROXY BENZALDEHYDE



### meta NITRO BENZALDEHYDE



### of potential interest as pharmaceutical intermediates or in organic syntheses

With their two functional groups attached to an aromatic ring, these National Organic Chemicals can be the stepping stones to an infinite number of chemical compounds. Reactions already reported give considerable fundamental data on which to base your own work.

#### Write for these NATIONAL TECHNICAL BULLETINS

National meta Hydroxy Benzaldehyde is covered in National Technical Bulletin I-15; National meta Nitro Benzaldehyde in National Technical Bulletin I-16, both of which give properties, characteristic reactions of the functional groups, unusual reactions and 189 literature references.

Both bulletins are well worth having if the projects or products on which you are working may be advanced by trying these National Organic Chemicals. Working samples are available to interested researchers.

### NATIONAL ANILINE DIVISION ALLIED CHEMICAL & DYE CORPORATION 40 RECTOR STREET, NEW YORK 6, N. Y.

Akron Atlanta Boston Charlotte Chattanooga Chicago  
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Portland, Ore. Providence Richmond San Francisco Toronto



Please send ☐ Technical Bulletin I-15 ☐ Technical Bulletin I-16.  
Our interest concerns possible use as a ☐ Chemical Intermediate  
☐ Pharmaceutical Intermediate.

Name \_\_\_\_\_

Position \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_



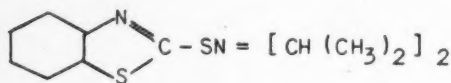
**High speed, high temp processing  
of rubber goods is made easy  
by delayed-action accelerator . . .**

cure rate is comparable to other thiazole accelerators

**Uses:** As a delayed-action accelerator for natural or synthetic rubber.

**Features:** Accelerator has adequate delayed action for use in modern, high-speed, high-temperature processing. Its cure rate is comparable to that of other thiazole accelerators. It gives maximum freedom from scorch.

**Description:** Compound is the diisopropyl sulfenamide of 2-mercaptobenzothiazole, and has the structure shown:



Light tan in color, the flakes melt at 55-59°C. Long contact with skin should be avoided as should taking it internally.

(Dipac is a product of Dept. SD, Pennsalt Chemicals, Dept. CP, 3 Penn Center Plaza, Philadelphia 2, Pa. . . or for more information check 1083 on the convenient Reader Service slip which is located opposite last page.)

**Nonionic softening agent  
imparts good qualities  
at lower costs . . .**

gives quality finishing to cotton textiles

**Uses:** As a softening agent for finishing cottons.

**Features:** Not only does this nonionic provide softness at a low cost per yard, but also imparts a high degree of luster, excellent resistance to water spotting, efficient sewability, and good resistance to yellowing. In addition to its softening and bodying characteristics, product shows consistent cost and quality advantages in finishing cottons.

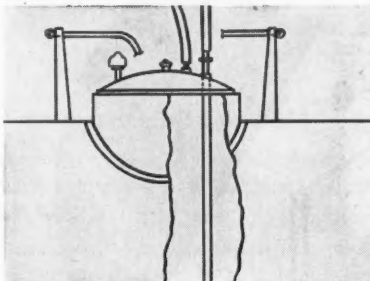
**Description:** Nonionic is a non-corrosive, 95%-active paste which readily disperses in 140°F water. Dispersions are stable at 140° and 212°F over long periods and over a pH range of 3.5-12. Agent is compatible with starches, weighting materials, wetting and rewetting agents. In many evaluations, one pound of this agent was found superior to 2-4 pounds of competitive products.

(Emersoft 7700 is a product of Emery Industries, Inc., Dept. CP, Carew Tower, Cincinnati 2, Ohio . . . or for more information check 1084 on form opposite last page.)

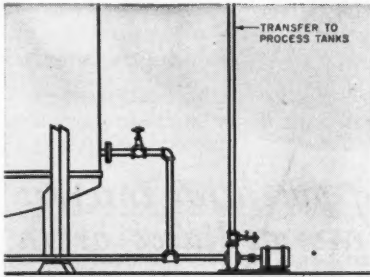
# BRIEFS FOR BUYERS

## about...Caustic Soda • Caustic Potash

### Caustic soda handling



### from tank car



### to process

How to handle liquid caustic soda is the subject of the newest Hooker bulletin.

Within the covers of the *Caustic Soda Engineering and Handling Guide* you'll find useful information on every phase of caustic soda handling.

Contents include recommended methods for unloading tank cars and for diluting, storing, and piping caustic soda. You'll also find advice on construction materials; detailed diagrams of equipment in typical installations; and a section on safety precautions and first aid.

One particularly useful section contains 18 full-page graphs, charts and tables with which you can predict and control the behavior of liquid caustic under a wide range of operating conditions.

Using this new bulletin as a guide,

you can handle caustic soda safely, efficiently, and with minimum risk of contamination. For a copy, check the coupon for Bulletin 102.

### 13 ways to buy Nialk® Caustic Potash

If you're using caustic potash at all, you're probably using the liquid form, 45% to 52% strength.

However, for those jobs where you require a different form or grade, we offer you these 12 alternatives as well:

- Solid; flake; granular; broken; crushed; powder; walnut—all at 90% strength.
- Solid and flake, at 85% strength.
- Liquid, low-chloride—45%.
- Solid or flake, low-chloride—both 85%.

This variety of forms is just one of many reasons why NIALK is the most popular of all brands of caustic potash, accounting for almost half the tonnage used in this country.

For complete specifications on all 13 forms and grades, and for a bulletin that describes our manufacturing and shipping methods, check the coupon.



### One gauge of good sodium sulfide—your shoe

A mathematician friend tells us the probability is that one of the shoes you are wearing was treated with a Hooker sulfide.

He bases his conclusion—faulty, perhaps, but thought-provoking—on the fact that more than 50% of

American leather is processed with Hooker sodium sulfide or sodium sulphydrate.

Why so much? Here are three reasons:

1. *Hooker sodium sulfide specifications*  
 $\text{Na}_2\text{S}$  ..... 60 to 62%  
 Water of Crystallization .... 35% Min.  
 $\text{NaCl}$  ..... 1.5% Max.  
 $\text{Fe}$  ..... 8 ppm Max.

### 2. Hooker packaging

Hooker sodium sulfide *always* comes to you in a brand new drum. A drum with a lining of special, inert lacquer that prevents iron pick-up during handling and storage. A drum whose lid is secured airtight with six sturdy lugs to prevent air and moisture contamination. A drum so successful at its task that one customer found Hooker sodium sulfide undamaged after *more than four years of storage in his plant!*

### 3. Hooker flakes

Hooker sodium sulfide consists of clean, firm flakes that dissolve rapidly into your process without stirring or decanting.

If you'd like to have information on sodium sulfide for reference, send the coupon for technical data sheet.

### Sodium benzoate—how thick should a flake be?

To all the men in your plant who must get a process working quickly





## Sodium Sulfide • Sodium Benzoate Lauryl Compounds • Chlorinated Paraffin

and efficiently, this is a very meaningful question.

We've answered it by making the Hooker sodium benzoate flake just thick enough to stay in one piece without dusting during handling, just thin enough to dissolve rapidly as it settles.

**Powder too.** For most processing, Hooker flake dissolves plenty fast enough, but for the jobs that require it, we supply a powder form as well.

### Both forms in two grades

**U.S.P. grade** is 99% pure and then some. It contains a maximum of 0.4 benzoic acid and 0.5% water.

**Technical grade** is still highly pure at 98%. Contains maximum of 0.4% benzoic acid. Remainder is water.

For a complete breakdown on physical and chemical properties, send coupon for technical data sheet.

### LAURYL COMPOUNDS— three are Hooker specialties

**Lauryl Chloride—you can be fussy**  
When you get Hooker lauryl chloride, you can choose from two grades:

**Technical grade** satisfies most normal requirements. It has a minimum of 15.5% chlorine. Its specific gravity is 0.862 at 25°/15.5°C.

If your process calls for a chemical with even better properties, you can get a **Refined grade**. Minimum chlorine content is stepped up to 16.0%. Specific gravity rises to 0.863 at 25°/15.5°C.

Both grades are mixtures of n-alkyl chloride ranging from C<sub>10</sub> to C<sub>14</sub>. The C<sub>12</sub> fraction predominates, accounting for about 80% of the compound.

### Lauryl Mercaptan

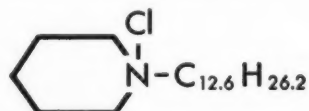
Another lauryl compound produced by Hooker, and used primarily as a polymerization modifier in the production of synthetic rubber, is lauryl

mercaptan. It has other uses as a chemical intermediate.

Hooker lauryl mercaptan has about 14.7% mercaptan sulfur in a formula which averages out to C<sub>12.6</sub>H<sub>26.2</sub>SH. Benzene solubility is 99.75%.

### Lauryl Pyridinium Chloride, (Tech.)

You can also get lauryl pyridinium chloride from us. It has about 85.0% alkyl pyridinium chloride with a pH of 6.0 to 7.5 in this formula:



Check the coupon for technical data sheets on any of these three lauryl compounds.

### The Big Top is gone—but not CP®-40, a chlorinated paraffin.

We watched the final folding of the Big Top a few months back with

more than the average pangs.

"The Greatest Show on Earth" used Hooker CP-40 to waterproof and fireproof all the canvas in its big tent.

Alas and alack—but then, there are many places where CP-40 is still of use. Perhaps some spots in your own operations?

Some people use CP-40-treated canvas and other fabrics to prevent hot sparks from welding equipment from flying around. Others put it into fire-retardant paints and other surface coatings.

You can put CP-40 into many, many formulations either through use of a mutual solvent or by emulsifying. Its chlorine content is about 42%.

By the way, we *don't* do the treating. You can use CP-40 yourself. Or we'll be glad to send you a list of firms which will treat materials for you.

### HOOKER ELECTROCHEMICAL COMPANY

501 Forty-seventh Street, Niagara Falls, N. Y.

Niagara Falls • Tacoma • Montague, Mich. • New York • Chicago • Los Angeles



063W20

**For more information on chemicals mentioned here, check below:**

- ☐ Caustic Soda Engineering and Handling Guide, Bul. 102
- ☐ Caustic Soda Technical Data Sheets
- ☐ NIALK Caustic Potash (data sheet)
- ☐ NIALK Caustic Potash (bulletin)
- ☐ Sodium Sulfide
- ☐ Sodium Sulfhydrylate
- ☐ Sodium Benzoate
- ☐ Lauryl Chloride
- ☐ Lauryl Mercaptan

- ☐ Lauryl Pyridinium Chloride
- ☐ CP-40, Chlorinated Paraffin

Keep your file up to date on these other Hooker chemicals:

- ☐ NIALK Carbonate of Potash
- ☐ Monochlorobenzene
- ☐ Muriatic Acid
- ☐ Sodium Tetrasulfide
- ☐ Sulfur Dichloride
- ☐ Sulfur Monochloride

Clip to your letterhead with your name and title, and mail to us. When requesting samples, please use business letterhead to help speed delivery.

### System produces a jet black acrylic automotive lacquer without grinding . . .

just dissolve the solid dispersion in a clear acrylic lacquer solution

**Uses:** In making a jet black acrylic lacquer for automobile finishes.

**Features:** With these black chips, there are no dispersion difficulties. By thorough agitation, chips are dissolved in a clear acrylic lacquer solution. No grinding is involved. Final finish has outstanding gloss, high hiding power, and permanency.

**Description:** Product is a complete colloidal dispersion in dry chip form. It is 22% Neo Spectra Mark II carbon black in 29.5% acrylic resin and 29.5% 1/2-sec nitrocellulose. Plasticizer content is 19%. The small amount of nitrocellulose in the final lacquer enhances the hardness and durability of the acrylic.

(Co-Acrylateblak NC-1401 is a product of Columbian Carbon Co., Dept. CP, 380 Madison Ave., New York 17, N.Y. . . . or for more information check 1086 on the convenient Reader Service slip which is located opposite last page.)

### 1,5-Pentanediol

Technical information on 1,5-pentanediol is presented in six-page manual. Physical properties and reactions are given. Applications described include use in making polyester resins for urethane foams and elastomers, glass fiber laminating resins, and in magnet wire enamels. Its esters are useful as vinyl plasticizers. Compound also makes specialty lubricants, brake fluid components, insect repellents, and special purpose solvents.

Bul F-40006 is issued by Carbide and Carbon Chemicals Co., a Div. of Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. When inquiring check 1087 on form opposite last page.

**You receive CHEMICAL PROCESSING . . .  
without subscription charge . . .**

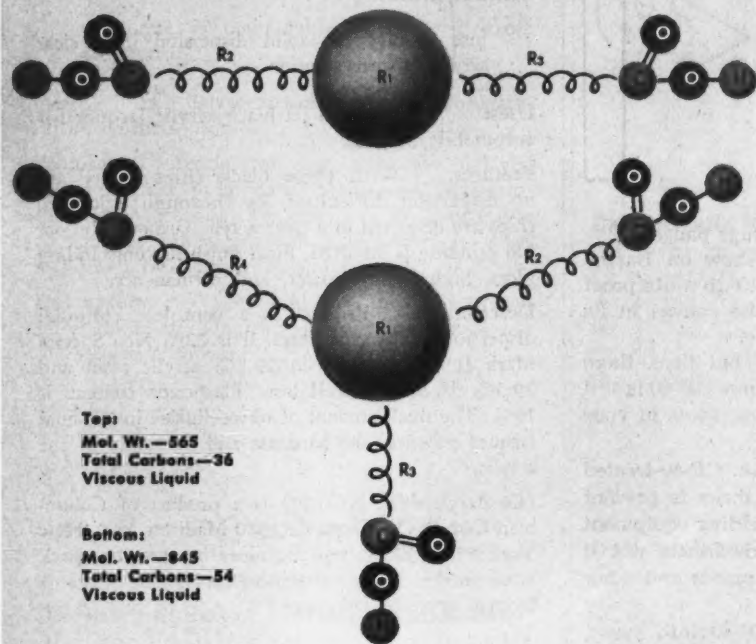
. . . because you are responsible for some phase of processing in your company.

Why does this circulation policy make this magazine more useful to you?

See page 93

When inquiring check 1085 opposite last page

## Want a Di- or Polybasic Acid that is DIFFERENT?



## Then try EMPOL® POLYMERIZED ACIDS!

Relatively low in cost, these viscous liquids offer a very unusual combination of high molecular-weight and polyfunctionality that should be of extreme interest to manufacturers of resins, polyesters, polymers and similar type materials for many fields of application. Such fields already include adhesives, coatings, corrosion inhibitors, de-emulsifiers, emulsifying agents, films, foams, lube additives, elastomers and surface coatings.

In addition to commercial Empol 1022 which contains 75% dibasic and 22% tribasic acids, Emery offers several "development" grades that are essentially all dibasic or tribasic. This added flexibility of composition offers additional opportunities for research in new fields as well as the fields where the commercial product is already used. Mail coupon below for complete literature on Emery Polymerized Acids.



Organic Chemical  
Sales Department

Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio

Emery Industries, Inc., Dept. CP-1, Carew Tower, Cincinnati 2, Ohio  
Please send literature on Emery Polymerized Acids. I am especially interested in ☐ dibasic,  
☐ polybasic materials for.....  
Name.....Title.....  
Company.....  
Address.....  
City.....State.....

When inquiring check 1088 opposite last page

## CHEMICAL MATERIALS

**Chemically-inert resin  
is a 'natural'  
for coatings . . .**

improves hardness, gloss, and other properties

**Uses:** In enamels, sanding sealers, textile finishes, adhesives, dry size, floor waxes, and paper coating.

**Features:** Resin improves hardness and gloss in enamels, and provides low-cost sealers with excellent sanding properties. It makes light-color, highly stable textile finishes. Adhesives that have excellent compatibility, light color, and use low cost solvents can also be made.

Dry sizes are non-tacky, mineral spirit-soluble. In floor waxes, resin imparts excellent color and resistance to color degradation. Along with waxes, resin provides low cost paper coating with excellent stability, water, acid, and alkali resistance.

**Description:** Resin is a copolymer of modified styrene, and is completely inert to action of acids, alkalis, salts, and water. Color is almost water-white and is stable to ozone, oxygen, and after-yellowing. It comes in three melting points — 100°, 110°, and 120°C — and in flaked or solid form. Completely soluble in aliphatics, it has a sp gr of 1.06 and a Gardner color of 2 (max).

(Piccotex is a product of Pennsylvania Industrial Chemical Corp., Dept. CP, Clairton, Pa. . . or for more information check 1089 on form located opposite last page.)

**Exceptionally high purity found  
in prime metal tin oxide made  
by oxidizing molten tin . . .**

facilitates processing of superior ceramic and plastics colors

**Uses:** As an ingredient in vanadium-tin yellows, chrome-tin reds, pinks and maroons, and tin-bearing blues, greens and grays for ceramic and plastics.

When added to the color glaze batch, the oxide serves as a color glaze stabilizer, and may also be used as an opacifier for highest quality white glazes. It is also recommended for use in the finest glazed wall tile, glazed sanitary ware, glazed structural tile, artware and dinnerware.

**Features:** The prime metal tin oxide is composed of extremely fine particles and is free from deleterious ingredients or contaminants. Its exceptionally high purity facilitates processing of superior colors. These colors are more brilliant and can be produced more uniformly.

**Description:** Prime metal tin oxide is made by oxidizing molten tin, instead of by chemical precipitation of tin hydrate. This new process is

# Have You Tried New

**Dow Corning  
ANTIFOAM B**

Processors who  
have tested  
Antifoam B  
say it is the  
easiest-to-use,  
most effective  
and most stable

**silicone defoamer**

ever developed!

- Ready for instant use.
- Disperses immediately in aqueous solutions.
- Stays in uniform dispersion.
- Extremely stable — won't separate, cream or lose its effectiveness even after freezing or boiling.
- Effective in minute concentrations.
- Can be diluted with water.

### FREE TRIAL

Write today for a  
generous free sample.  
Dept. 3213

first in  
silicones

**DOW CORNING  
CORPORATION**  
MIDLAND, MICHIGAN

When inquiring check 1090  
opposite last page

CHEMICAL PROCESSING



## CHEMICAL MATERIALS

carried out in modern equipment under rigid controls, and gives unvarying quality of output. (Manufacturer will continue to produce precipitated tin oxide for certain applications.)

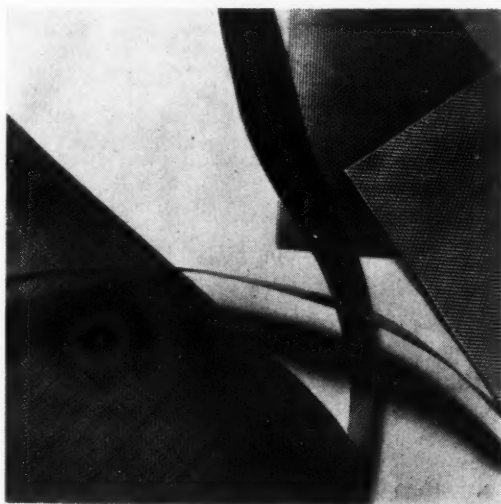
(Prime metal tin oxide is a product of Metal & Thermit Corp., Dept. CP, 100 Park Ave., New York 17, N.Y. . . . or for more information check 1091 on form opposite last page.)

### Coats glass fabric with Teflon . . .

product is chemically inert, dimensionally stable, flexible and tough

**Uses:** As a gasket or diaphragm liner and in chemical labs as a protective apron to enable quick, safe movement of corrosives.

**Features:** Although glass itself is quite inert, Teflon coating will prevent attack by chemicals which affect glass. Teflon is unaffected by all



known chemical agents, except molten alkali metal and fluorine and chlorine trifluoride under special conditions. Surface of the fabric is smooth and non-sticky, tough and dimensionally stable. Flow under combined heat and pressure is very low, while flow under compressive load is zero. Material remains pliable at temperatures lower than -100°F and remains inert up to 390°F.

**Description:** Teflon-coated glass fabrics, tapes, and laminates are available in standard, single-ply constructions for multiple-ply laminates. They may be Bondized on one side only for adhesion to a variety of materials.

(Teflon-coated glass fabrics are products of Shamban Engineering Co., Dept. CP, 11617 W. Jefferson Blvd., Culver City, Calif. . . . or for more information check 1092 on form opposite last page.)



## Here's a RADICAL-LY different glycol

### CELANESE 1, 3 BUTYLENE GLYCOL

1,3 Butylene Glycol is a low-cost, 4 carbon glycol with unusual stability. Its combination of two non-adjacent hydroxyl groups prevents dehydration or ring closure. It is highly hygroscopic, non-toxic and soluble in water and most organic solvents.

1,3 Butylene Glycol's longer chain length and steric configuration open new possibilities for producers of textile lubricants; alkyds, polyurethanes, and polyester resins; printing inks; dyes; cosmetics; toilet goods and elastomers.

It is of particular interest in the preparation of phthalic, maleic and fumaric alkyd resins and polyesters for plasticizers, coating materials, laminates, and potting compounds.

1,3 Butylene Glycol is available from Celanese in tank cars, compartmented cars and drums. Find out how this unusual glycol can improve your product . . . save you money in production costs. Write us for further information. Celanese Corporation of America, Chemical Division, Dept. 591-A, 180 Madison Avenue, New York 16, New York. Export Sales: Amcel Company, Inc. and Pan Amcel Company, Inc., 180 Madison Avenue, New York 16, New York.

### SUGGESTED USES

- **POLYESTERS.** Polyesters prepared with 1,3 Butylene Glycol are non-crystalline in structure due to the glycol's steric configuration.
- **POLYURETHANES.** Saturated polyesters can be prepared from 1,3 Butylene Glycol with various polyfunctional acids and alcohols.
- **SURFACE ACTIVE AGENTS.** Esterified with fatty acids or etherified with alkylated phenol, 1,3 Butylene Glycol produces non-ionic detergents with good emulsion breaking properties and improved compatibility with non-polar compounds.
- **POLYMERIC PLASTICIZERS.** Plasticizers with improved oil compatibility and solubility properties are obtained from the longer chain length of 1,3 Butylene Glycol.
- **HUMECTANTS.** Low volatility, low toxicity and good hygroscopicity properties make this glycol desirable as a humectant for tobacco, cosmetics, and paper.
- **COUPLING AGENTS.** Mutual solubility with water and various organic materials make 1,3 Butylene Glycol a useful blending and coupling agent for various pastes, dyes, textile lubricants, greases, and toilet goods.



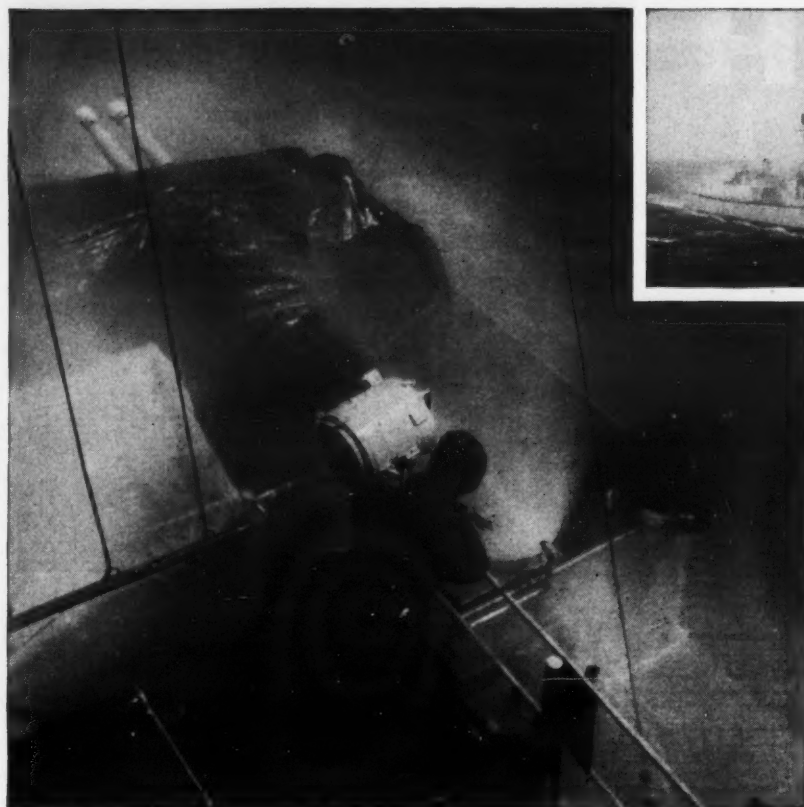
Celanese®

When inquiring check 1093 opposite last page



Another new development using

# B.F. Goodrich Chemical raw materials



Pipe and fittings of Geon are joined easily with solvent cement, simplifying installation.



## Now ships shower themselves to wash away radioactive contamination

**N**UCLEAR explosions produce a deadly byproduct—radioactive fall-out. As a counter-measure, the Navy has devised a washdown system which enables a ship to spray itself with thousands of gallons of sea water, washing away contamination within minutes.

First, metal piping was tried for the system—but it added too much weight. The answer was found in rigid vinyl plastic pipe, made of Geon polyvinyl materials. This piping weighs but one-fourth as much as metal. It's impervious to sea water's corrosive effects, unaffected by either freezing

or tropical temperatures. And, using simple but strong solvent-welded joints, it's so easy to install that the ship's crew can do the job easily. The washdown system was developed by the U. S. Navy's Bureau of Ships. The Grinnell Company, Inc. was the principal contractor in this effort.

This is only one of the many applications of Geon polyvinyl materials, ranging from rigid products like ductwork to flexible products like upholstery, from coatings for textiles and metal, to foam for cushioning and crash padding. Investigate this remarkable material for your products.

For more information write Dept. DD-1, B. F. Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, O. Cable address: Goodchemco. In Canada: Kitchener, Ontario.



**B.F. Goodrich Chemical Company**  
A Division of The B.F. Goodrich Company



GEON polyvinyl materials • NYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors

When inquiring check 1094 opposite last page

## CHEMICAL MATERIALS

**Low-density anion exchanger has high physical strength, yet is flexible . . .**

for waters with high percentage of weak acids to total anions

**Uses:** In water demineralization, and in sugar refining, uranium processing, and plutonium recovery, where there is a high percentage of weak acids to total anions.

**Features:** The spherical particles have exceptional physical strength, yet are flexible. Particle size gives optimum hydraulic characteristics, of high importance in handling low density ion exchange resins.

**Description:** This strongly basic anion exchange resin is produced from styrene and divinylbenzene and contains quaternary ammonium groups.

Operating temp should be below 150°F and flow rate is 6 gpm/sq ft for 36" beds, 2 gpm/cu ft for shallower beds. Density (chloride form) is approx 40 lb/cu ft. Mesh size is 20-40, and void volume is 2.85 gal/cu ft. Product can be regenerated with NaOH at 3.5+ lb/cu ft at 75-120°F.

(Nalcite SBR, Porous Grade, is a product of National Aluminate Corp., Dept. CP, 6216 W. 66th Pl., Chicago 38, Ill. . . or for more information check 1095 on form opposite last page.)

**Resin gives non-brittle films for paper, textile sizing and hair lacquers . . .**

dimethyl hydantoin formaldehyde resin dissolves in water, is compatible with other ingredients

**Uses:** Resin is used in textile sizing and paper coating, and also in hair-sets (hair lacquers) in aerosols and liquid solution.

**Features:** When blended with plasticizers, compound deposits non-brittle films. It dissolves readily in water giving solutions of low viscosity at high concentrations. Compound is compatible with gelatin, dextrin, starch, polyvinyl alcohol, and neutralized polymethacrylic acid in all proportions. In certain proportions it is compatible with sodium carboxymethyl cellulose, casein, and zein.

**Description:** Dimethyl hydantoin formaldehyde (DMHF) resin is water-white, has initial softening point of approximately 60°C. It is soluble in alcohols, esters, ketones, chloroform, and methylene chloride. It is insoluble in aromatics, ethers, trichloroethylene, and carbon tetrachloride.

(DMHF resin is a product of Glyco Products Co., Inc., Dept. CP, Empire State Bldg., New York 1, N.Y. Check 1096 opposite last page.)

**Improves shelf stability, hiding power, development and uniformity of color in emulsion paints . . .**

liquid nonionic dispersant is effective in PVA, acrylic, and butadiene-styrene paints

**Uses:** As a liquid nonionic dispersant for emulsion paints, particularly polyvinyl acetate, acrylic, and butadiene-styrene paints.

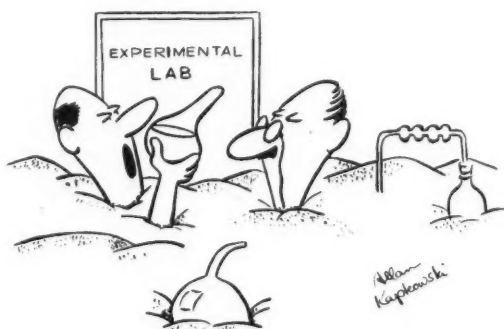
**Features:** Dispersant promotes increased hiding power, greater color development, improved color uniformity in brush-out, better shelf stability, and low foam.

**Description:** Nonionic is 83% active and freezing point (solid) is approximately 0°C. It also has:

Density (g/ml @ 25°C)	1
Boiling point (°C)	>250
Water solubility (wt % for clear solution @ 25°C)	0.5
Draves sinking time @ 25°C	
0.2 wt %	instantaneous
0.1 wt % (sec)	5
0.05 wt % (sec)	43
0.025 wt % (sec)	>300
Surface tension (0.1% aq. soln., dynes/cm @ 25°C)	27.6
Bulking value (gal/lb)	0.12

Dispersant is used in 0.5-1% amounts in formulations. The amount varies somewhat with brand of emulsion employed, especially in PVA systems. Using a PVA emulsion in which the emulsifier contributes little to pigment dispersion will require higher percentage of dispersant.

(Surfynol TG is a product of Air Reduction Chemical Co., a Div. of Air Reduction Co., Inc., Dept. CP, 150 E. 42nd St., New York 17, N.Y. . . . or for more information check 1097 on form located opposite last page.)

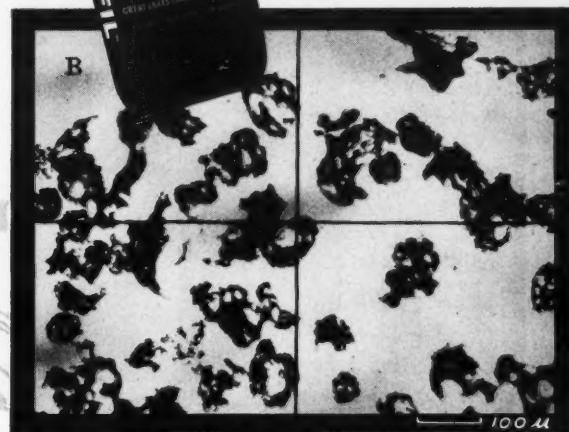
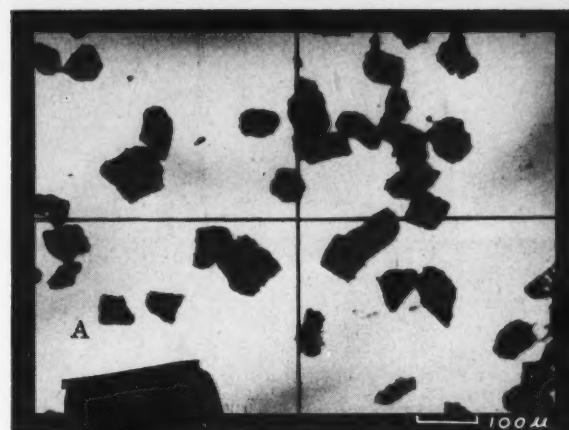


*"By George, we've done it! An inexpensive way to take salt out of seawater!"*

Cartoonist Kapkowski is with Esso Standard Oil Company, Bayway Refinery, Linden, N. J.



let's turn the microscope on



*Nerofil ...*

**the completely new Filteraid for use in strongly alkaline liquors -**

The idea of using carbonaceous filteraids in processes involving caustics or fluorides is not new. But NEROFIL—a processed carbon-based filteraid—is completely new . . . and valuable because it overcomes the difficulties often encountered with earlier carbon materials.

(A) is a photomicrograph of a crushed carbonaceous material (quite similar to previous carbon filteraids). This, however, is merely the reactor feed from which NEROFIL (B) is made. Both photomicrographs are the same magnification. The marked differences are evident.

NEROFIL's success as a filteraid stems from two important features. First, of course, its physical and chemical stability . . . even boiling caustic has negligible effect. Second, the high filter cake porosity and low cake density of NEROFIL yield fast throughput of liquid and superior clarity of filtrate.

This stability and filtration efficiency have led several different industries to adopt NEROFIL in their processing, with excellent results. Complete information on NEROFIL is available to you in a new bulletin, just issued . . . write for it.

**Great Lakes Carbon Corporation**

Nerofil Department — 612 So. Flower St., Los Angeles 17, Calif.  
Dept. LTK — 333 No. Michigan Ave., Chicago 1, Ill.

When inquiring check 1098 opposite last page



*if you use* **ANILINE**

## here are 4 good reasons to specify NATIONAL!

Now there are four big reasons why Aniline users should make National their first source of supply.

**QUALITY**—Our Moundville Aniline is water-white, clear and exceptionally pure. It exceeds A. C. S. specifications for C. P. Aniline.

**UNIFORMITY**—By National Aniline's continuous hydrogenation process. Absolute uniformity is assured by automatic instrumentation.

**DEPENDABLE SUPPLY**—Recently doubled capacity provides an ample supply to meet the demands of quality-minded Aniline users.

**PROMPT DELIVERY**—From our strategic location on the Ohio River just south of Wheeling, West Va., we make fast shipments by rail, truck or inland waterway.

We will be pleased to furnish samples, specifications, price and delivery quotations.

### NATIONAL ANILINE DIVISION ALLIED CHEMICAL & DYE CORPORATION 40 RECTOR STREET, NEW YORK 6, N. Y.

Akron Atlanta Boston Charlotte Chattanooga Chicago  
Columbus, Ga. Greensboro Los Angeles New Orleans Philadelphia  
Portland, Ore. Providence Richmond San Francisco Toronto



## CHEMICAL MATERIALS

### Polyethylene for vacuum forming . . .

economics favor small runs

**Uses:** For vacuum-formed products.

**Features:** Low mold costs provides greater product versatility. Users will realize a substantial savings on small production runs.

**Description:** Polyethylene material comes in red, black, blue, brown, green, white, yellow and orange. It is also available in extruded rolls and in sheets up to 48x96" and in gages from 0.020 to 0.250".

(Polyethylene is a product of Seiberling Rubber Company, Plastics Div., Dept. CP, Akron 9, Ohio . . . or for more information check 1099 on convenient Readers Service slip which is located opposite last page.)

### High-boiling phenols in resin making

Four-page mimeographed bulletin describes high-boiling phenols, a mixture of alkyl-substituted phenols boiling at 240-270°C, for use as an ingredient of phenolic resins. These phenols combine a high degree of trifunctionality with a hydrocarbon loading. They increase moisture and chemical resistance, flexibility, mold release, compatibility, non-conducting electrical properties, and hot flow in the resins.

Bul F-8103B is issued by Carbide and Carbon Chemicals Co., a div. of Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. When inquiring check 1100 on convenient Readers Service slip opposite last page.

For more information on product at left, specify 1101 . . . see information request blank opposite last page.



**Effective moth-proofing insecticide  
now supplied as concentrate  
to facilitate formulating . . .**

gives high kill yet has extremely low mammalian toxicity

**Uses:** In formulating pressurized moth-proofing sprays and household aerosols.

**Features:** Although available previously in technical form, product now comes as a concentrate, which facilitates handling and formulation. Insecticide has high killing power against many insect pests, good solubility in odorless solvents, and extremely low mammalian toxicity.

**Description:** Perthane is approved for use in pressurized moth-proofing sprays in concentrations as high as 6% and in household space aerosols to a level of 3%. Concentrate is a 75% solution in methylene chloride.

(Perthane concentrate is a product of Agricultural and Sanitary Chemicals Dept., Rohm & Haas Co., Dept. CP, Washington Square, Philadelphia 5, Pa. Check 1102 on form opposite last page.)

**Pair of light-colored polymers  
give outstanding performance  
as vinyl plasticizers . . .**

electrical properties, age resistance are high

**Admex 760** is a pale-colored polymeric plasticizer that gives outstanding performance and is non-migrating. It is especially meant for top quality vinyl sheeting and extrusions, especially where color control is a problem. Compound provides greater versatility in formulation and allows faster processing speeds. Electrical properties are excellent and the plasticizer retains its physical properties, even after extended exposure to high heat.

**Admex 761** has a much lower viscosity than the above, and combines low volatility and unusual permanence. Soapy water extraction resistance appears to be the finest of any commercially-available polymeric in similar viscosity range and is better than many having higher viscosities. Color is very light and electrical properties are excellent.

Physical properties of the two compare thus:

	Admex 760	Admex 761
Refractive index	1.47	1.48
Viscosity (Stokes @ 25°C)	1600	37
Sp gr	1.14	1.11
Acid value	2.0	2.0
Color (G-H '53)	2	2
Freeze point (°C)	-40	-35

(Polymeric plasticizers for vinyls are products of Vinyl Plasticizer Dept., Archer-Daniels-Midland Co., Dept. CP, 700 Investors Bldg., Minneapolis 2, Minn. . . or check 1103 opposite last page.)



**WRITE FOR  
THIS FOLDER**

**See why and how Swift's Stearic Acids  
invite comparison . . .**

If this folder reported in detail all the laboratory testing and research that have gone into its preparation, it might take you 10 hours to read. But you can read it from cover to cover in 10 minutes—and throw it away when you're through!

But, toss it or treasure it, if you use stearic acid there's a story in this folder for you. It's quick, it's basic and it's documented—it's this:

*Swift's Stearic Acids invite your comparison on the basis of color, color and heat stability, freshness and application purity to that of any product manufactured for similar use.*

The folder reports on exhaustive comparative tests made between Swift's Stearic Acid and as many as 7 similar products on the above points. Reduced to their essentials, the results of these tests mean this to you:

Swift's Stearic Acids are shipped fresh to stay fresh.

Swift's Stearic Acids are bland in odor, stable in color.

Swift's Stearic Acids are the right start if purity pays and uniformity sells in your business.

Write for the folder—see what we say, then write for a trial order and see what we mean when we say . . .

ONE TRIAL IS BETTER  
THAN A THOUSAND CLAIMS



*To Serve  
Your Industry Better*

are the RIGHT START for



Oleic Acid (Red Oil) • Animal Fatty Acids • Textile Processing Oils • Stearic Acids • Hydrogenated Fatty Acids • Larex (Swift's Lard Oils) • Neatex (Swift's Neat's-foot Oils) • Spermaceti U.S.P. • Hydrogenated Glycerides • Sperm Oils • Glycerine • Anti-Foam Agents • Monoglycerides • Sulfonated Oils • Palmex (for Steel Mills) • Tallows • Vegetable Fatty Acids

**USE THIS COUPON FOR FURTHER INFORMATION**

Swift & Company, Industrial Oil Dept.  
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O-21R

Please send data on the following products:

☐ Send Stearic Acid folder.

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When inquiring check 1104 opposite last page

# THE PLENTIFUL RARE EARTHS

some facts about a clubby clan of elements that are rare in name only

a report by LINDSAY

**W**e got to thinking the other day that perhaps a lot of industry folks are passing up a diamond-studded opportunity because they believe the rare earths are unavailable in commercial tonnages. Nothing could be farther from the truth. Rare earths are *not* rare! Commercial salts of the rare earths are available, right now, for prompt shipment in quantities from a gram to a carload.

That the rare earths are so plentiful is due, in large part, to Lindsay. During the last 50 years, Lindsay has developed the extraction and separation of rare earths to a high degree.

New equipment and processes are now in operation at Lindsay's West Chicago plant and are producing greater quantities of these versatile materials in higher purities than before.

**FROM 57 THROUGH 71**—Some chemists call rare earths Lanthanides, Lanthanons or the Lanthanum Series. Actually they are not earths, but trivalent metals, a rather amazing family of elements . . . atomic numbers 57 through 71. They are grouped together because they are always found together, with thorium and yttrium, in ores such as monazite, and all have closely related properties. While rare earths are technically metals, Lindsay produces them in chemical salt forms—individually or in combinations.

ATOMIC NUMBER	ELEMENT
39	Yttrium
57	Lanthanum
58	Cerium
59	Praseodymium
60	Neodymium
62	Samarium

ATOMIC NUMBER	ELEMENT
63	Europium
64	Gadolinium
65	Terbium
66	Dysprosium
67	Holmium
68	Erbium
69	Thulium
70	Ytterbium
71	Lutetium
90	Thorium

## SOME USES FOR RARE EARTHS

**LANTHANUM**—As lanthanum oxide in a high refractive optical glass, particularly for aerial cameras and other instruments.

**CERIUM**—Glass polishing. Scavenger in explosives production. Radiation protection glass for atomic reactors. Opacifier for porcelain. Oxidizing catalysts in organic preparations. Ultraviolet light absorber.

**MIXED RARE EARTHS**—Misch metal for lighter flints and alloy uses. Motion sickness medication. Cores of arc carbon electrodes. Aluminum and magnesium alloys.

**PRAESODYMIUM & NEODYMIUM**—Dichroic colorants for ceramic glazes and glass. Used in better grade sun glasses. They do not lower light permeability and index of refraction when used as colorant or decolorizer. Ceramic capacitors.

The rare earths are becoming increasingly important in the production of steel and steel alloys. Small quantities added to the metal in the ladle result in a strong, fine-grained steel. Steel thus treated has great resistance to low temperature oxidation and corrosion. Stainless varieties have better hot and cold workability. Silicon and electrical

grade steels have better electrical qualities.

Rare earths added to cast iron act as powerful deoxidizers and help remove sulfur from the molten metal. They are responsible for cast iron that is resistant to scaling at higher temperatures and to certain corrosive atmospheres. In malleable metals, they act as a carbide stabilizer.

Magnesium-rare earth-zirconium alloys have excellent casting qualities and mechanical properties that make them ideal for important light-weight stressed components of aircraft engines.

Other rare earth compounds are used extensively for waterproofing, mildew-proofing, weighting and dyeing of fabrics and compounding printing inks and phosphors.

**LIKE AN ICEBERG**—You might compare uses for the rare earths to an iceberg. What you see is only a small part of what lies undiscovered under the surface. In all probability, there is a real place for one or more of the rare earths in your operations. New uses—and profitable ones, too—are being discovered constantly. These versatile elements offer so much promise in so many different ways they merit your investigation.

To industries interested in the rare earths, we offer detailed technological data compiled over the years by our research staff. We will also furnish samples for experimentation.

And please remember . . . the rare earths are *plentiful*. Lindsay can supply you with quantities from a gram to a carload.

## chemical materials

High pigment-binding capacity, adhesion, and water resistance of modified acrylic copolymer —

make high-quality exte



CP Staff Photo

The men behind this development (left to right): Ivan V. Wilson, Asst. Director of Technical Service, Charles H. Parker, Jr., Technical Service Manager, Robert B. Werner, Technical Service Representative, Frank J. Hahn, Research Group Leader, and John A. Gordon, Jr., Technical Service Representative

**Uses:** As a highly effective binder for exterior and interior latex paint and for certain industrial applications where very high pigment loading is required or desired.

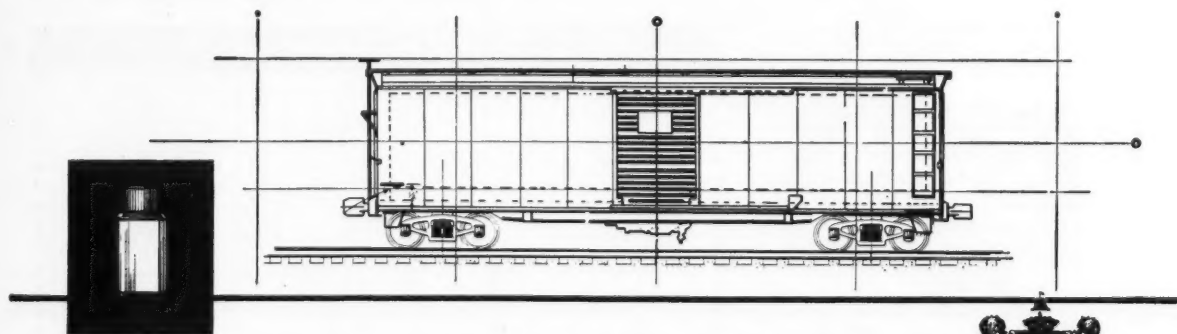
**Features:** Final paint films have great adhesion, permanent flexibility, color retention, and early water resistance without sacrificing stability. Proper binding of high volumes of pigment is insured by the controlled small particle size of the latex.

These characteristics make possible the use of conventional paint-making equipment. Formulating and manufacture are not complicated.

The binder has exceptionally good weatherability and excellent film-forming characteristics. Film strongly resists oxidation, and is particularly suitable for exterior surfaces. Dirt retention is very low. Even at temperatures that are near freezing, the latex can bind an unusually high volume of pigment into a tight, water-resistant film in a relatively short period.

The binder has good resistance to chalking and blistering. It is non-toxic and non-irritating to the skin. Paints brush on easily, and have a mild, transient odor which quickly dissipates after application.

**Description:** Lytron 680 is an interpolymers latex made from a combination of monomers balanced to give a material which will form a film at temp less than 40°F without modification.



PLEASE ADDRESS INQUIRIES TO

**LINDSAY CHEMICAL COMPANY**

288 ANN STREET • WEST CHICAGO, ILL.

When inquiring check 1105 opposite last page

nd  
ner —

## Quality exterior water-base paints

Chemically, it is a modified acrylic-type copolymer. The latex is supplied at a pH of 9.0-9.5 which allows use of a variety of pigments and surface-active agents already familiar to latex paint formulators. Latex contains less than 1% residual monomer. It is low foaming and is supplied as a white opaque liquid.

### Properties of Lytron 680

Total solids (%)	46-48
Sp gr of latex	1.018-1.020
Sp gr of solids	1.042
Viscosity (cps)	20-110
Mechanical stability	Excellent
Initial grain content	Negligible
Freeze-thaw stability (one cycle)	No deviation from initial grain specs.
Package stability	Excellent

Performance tests have been underway for almost two years, and reports have been very favorable. An exterior paint formulation, such as that used in these tests, is given. Note the high pigment volume concentration and the abnormally high ratio of Anatase to Rutile  $\text{TiO}_2$  in this formula. These quantities were chosen to test the pigment-binding capacity of the latex and to promote some chalking and cleaning of the film during its life.

Materials	Pounds
Hot Water	72
Tamol 731 (25% soln) (Rohm & Haas)	4
Methocel (400 cps)	4
Cold water	121
Dowicide A (Dow)	5
Tetra potassium pyrophosphate	4
Rutile $\text{TiO}_2$	150
Anatase $\text{TiO}_2$	100
ASP 400 Clay	60
WCD 1648 Talc	300
Water	187
Lytron 680	395
Butrol (a fungicide)	5

(Please turn to next page)

# Chemical Processors: Raymond invites you to explore the unusual properties of our **LAURYL SULFATES\***

**\*PENDIT® WA COSMETIC** (Grade) is the new surface active agent manufactured by Raymond Laboratories, Inc., 20-year specialists in the beauty aids preparation field. The lightest colored sodium lauryl sulfate known, only Raymond guarantees consistent, built-in uniformity.

**The properties of PENDIT WA COSMETIC are unique:** Nowhere else can you get the same viscosity, the same degree of emulsification, and the stability—batch after batch—without detergent variation problems that necessitate constant formula correction. Practically water-white, PENDIT WA COSMETIC is essentially iron free and has a low salt content. Neutral and stable, continuing tests demonstrate unvarying results from lot to lot.

**The uses for PENDIT WA COSMETIC are unlimited:** In industrial emulsions; in the textile field for scouring; in the preparation of liquid and paste cream shampoos; in cosmetic suspensions and emulsions; in liquid dishwashing compositions, car washes and personal cleansing products; in short, wherever a mild but effective detergent and a powerful emulsifier are needed. Three viscosity grades are available: LV (low), MV (medium) and HV (high)—all cosmetically

pure, competitively priced, and obtainable in commercial quantities.

### Raymond ALSO SUPPLIES THESE NEW LAURYL SULFATES

**\*PENDIT WA-T (Triethanolamine lauryl sulfate)**  
A clear fluid liquid with low cloud point, outstanding color, foaming, detergency and wetting properties for liquid clear shampoos and foaming hand cleaners.

**\*PENDIT WA-D (Diethanolamine lauryl sulfate)**  
A 35% active anionic detergent of pronounced color stability for liquid clear shampoos.

### AN INVITATION FROM Raymond

Consider your chemical processes. Can a high foaming, cosmetic grade sodium lauryl sulfate improve efficiency, better the quality, earn extra savings in time and money, or add sales appeal to your product? A new product data booklet on PENDIT WA COSMETIC is yours for the asking. Product data sheets are also available on PENDIT WA-T and PENDIT WA-D. Our technical staff will be glad to supply you with formulas or formula suggestions, as well as working samples, and work with you on your problems. Drop us a line on the coupon below describing your process or idea. There is no obligation.

Describe Your Application, Clip and Mail Today

**Raymond LABORATORIES, INC.**  
267 East Fifth  
St. Paul 1, Minnesota

Send complete information on the lauryl sulfates checked below:  
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☐ Sample ☐ Sample ☐ Sample  
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This highly pure, saturated, long-chain acid, now available in production quantities, will help you develop interesting new products.

ADM Behenic Acid can be esterified with fatty alcohols to produce high melting point waxes. Because it stabilizes emulsions this material

is ideal for soaps, lotions, cosmetics, lubricants, chemical intermediates, esters, stabilizers, and specialties.

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Hydrogenated and Distilled Fatty Acids and Stearic Acid  
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... Behenic Acid  
... Erucic Acid  
... Hydroxystearic Acid  
... Olefins  
... Hydrocarbons.

#### AVERAGE SPECIFICATIONS

Titre	69 to 73°C
Acid Number	168 to 174
Iodine Number	4 (Max.)
Saponification Number	169 to 175
Average Molecular Weight	320 to 332
Specific Gravity @ 100/25°C	0.8286
Color (5/4" Lovibond)	Max. 25 Y/2.5R

**ADM** an American company

THE INVESTMENT BUILDING COMPANY, MINNEAPOLIS, MINN.

When inquiring check 1107 opposite last page

## CHEMICAL MATERIALS

### Water-base Paints

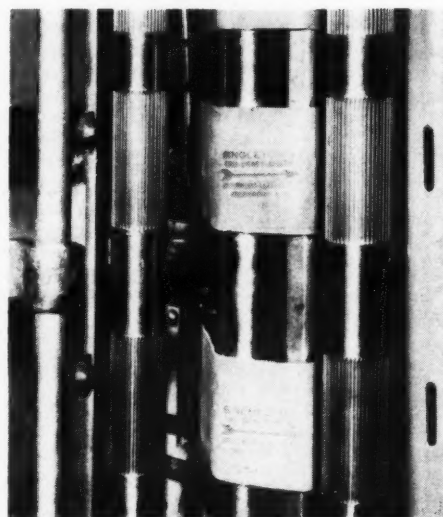
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This paint has these properties:

Total solids (%)	57.4
Viscosity (KU)	68-72
Weight/gal (lb)	12.1
Pigment volume concentration (%)	50
Solids volume (%)	38

Exterior paints have been applied to concrete, stucco, masonry, cinder block, cement-asbestos shingles, and previously painted wood.

(Lytron 680 is a product of Monsanto Chemical Co., Plastics Div., Dept. CP, Springfield 2, Mass. . . . or for more information check 1108 on convenient Readers Service slip which is located opposite last page.)



### Toughens leather belting

Increased abrasion resistance and tough surface of leather belting that has been impregnated with Chemigum latex has resulted in much longer life on "draft aprons" driving a spinning machine in a Southern textile mill. In addition, belts are now oil and water resistant. Mill's management estimates a savings of 25 to 50% because of the increased service life.

(Chemigum latex, a butadiene-acrylonitrile copolymer, is a product of Chemical Div., Goodyear Tire & Rubber Co., Dept. CP, Akron 16, Ohio . . . or for more information check 1109 on form which is located opposite last page.)

# Mono Oleates Di

of  
Diglycol

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Diethylene Glycol

Polyethylene Glycol

Propylene Glycol

Polyoxyethylene

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Glycerine

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When inquiring check 1110  
opposite last page

CHEMICAL PROCESSING

**Eliminate foam, help improve paper, scrap paper deinking, adhesive coating colors . . .**

won't become rancid in storage or impart rancidity to finished paper

**Uses:** In the paper industry: in the "white water" returning to the feed-box of a paper-making machine, and in scrap paper deinking processes. Products are also effective leveling agents in both starch and proteinaceous adhesive coating colors.

**Features:** By preventing foam formation and destroying existing foam, these two materials reduce objectionable air voids. In scrap paper deinking, they emulsify ink puddles and facilitate screening recovered pulp. The defoamers are effective leveling agents in adhesive coating colors.

Neither will become rancid in storage or impart rancidity to finished paper.

**Description:** Defoamers are liquid, non-ionic surface-active products. Recommended concentration in "white water" is 1-3 lb/ton of finished paper.

	Defoamer 2A	Defoamer 3
Color	Brown	Lt. brown
Consistency	Oily	Thin oil
Slushing temp (°F) (freezing)	61	48
Melting temp (°F)	75	62
Flash point (°F, COC)	325	150
Sp gr (@ 80°F)	0.93	0.86

(Defoamers 2A and 3 are products of Witco Chemical Co., Dept. CP, 122 E. 42nd St., New York 17, N.Y. . . . or for more information check 1112 on form opposite last page.)



"I think we'd better invest in a Geiger counter . . ."

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**SNODOTTE  
FATTY ACIDS**

**LONG CHAIN-40% C<sub>20</sub> AND C<sub>22</sub>**

If you make candles, shaving creams, textile chemicals, shampoos, and the like, you are probably continually seeking an extremely white fatty acid for easy-to-merchandise products.

**THEN LOOK TO  
SNODOTTE  
FATTY ACIDS!**

SPECIFICATIONS	
Titre	54°C Min.
Acid Number	193 to 198
Iodine Value	3 max.
Saponification Value	194 to 199
Average Molecular Wt.	282 to 289
Specific Gravity @ 100/25°C	0.832
Color 5 1/4" Lovibond	Max. 10/1R

With a 3 maximum iodine value, SNODOTTE Acids give you products that won't darken or oxidize. With a maximum 10Y/1R Lovibond rating, you can visualize the extreme whiteness of SNODOTTE. It's a long chain acid (40% C<sub>20</sub> and C<sub>22</sub>) with excellent coupling qualities and contains no polyunsaturated acids. SNODOTTE is second to none for high quality aluminum stearates, lubricating greases and plastics. Write on your letterhead for a sample of SNODOTTE, along with full technical information.

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Hydrogenated and Distilled Fatty Acids and Stearic Acid . . .  
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Acid . . . Hydroxystearic Acid . . . Olefins . . . Hydrocarbons.



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or pilot  
quantities**



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requirements in these

**borate-  
esters?**

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American Potash & Chemical Corporation now offers Trimethyl Borate in commercial volume and other TRONA® Borate Esters in pilot plant quantities. As the first to announce a variety of organo-boron compounds in research amounts, TRONA's ever-expanding experience is available to help you evaluate these chemicals for your own research and development program.

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When inquiring check 1111  
opposite last page

JANUARY 1957

Another forward step in peaceful use of atomic energy is taken as Mallinckrodt goes into production of nuclear fuel at Hematite, Mo. Thorough pilot plant work and an engineering department well versed in nuclear design parameters resulted in . . .

## SAFE PRODUCTION OF ENRICHED URANIUM OXIDE

THEODORE W. WETT, Assistant Editor  
with DR. G. W. TOMPKIN, Production Manager  
Mallinckrodt Chemical Works, Hematite, Mo.

When Mallinckrodt engineers designed company's new uranium dioxide plant, careful attention was paid to additional design requirements imposed by the nature of nuclear fuel material. Dimensions of process equipment, including vessels and piping, were limited. Moderating effects of materials of construction and solvents used in processing were considered. Concentration of reactive material in any portion of process had to be carefully charted. Plant geometry and handling techniques are so designed that only "always-safe"

batches can be processed. In addition, all possible sources of dust are enclosed, exhausted, and filtered to prevent loss of product, air pollution, or danger to workers.

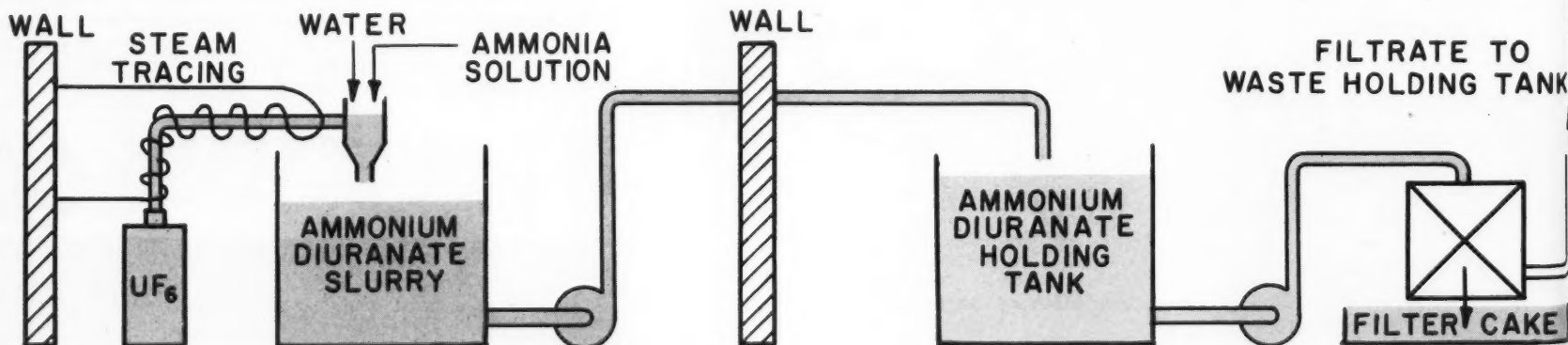
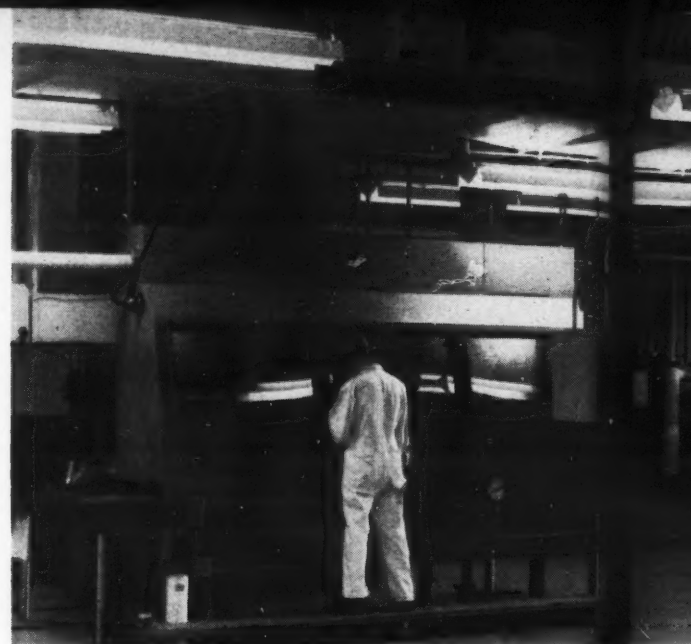
Plant, the first built with private capital for production of  $UO_2$  nuclear reactor fuels, from  $UF_6$  operates in two bays: one bay produces high-concentrate material (approx 90% U-235) for reactors where weight and size are critical, such as in airplanes, submarines, or locomotives. Second bay handles low concentrates, up to 3% U-235.

**Process proceeds as follows:** Raw material is received from AEC as  $UF_6$  liquefied gas. After hydrolysis, it is precipitated as ammonium diuranate with a solution of ammonia and water. Diuranate is dried at about 238°F to remove moisture and

produce "black" oxide,  $U_3O_8$ . This oxide is then ground to desired size and fired in a cracked ammonia atmosphere at 1500°F to form  $UO_2$  suitable for use in pellet fuels. Charge is cooled in  $N_2$  atmosphere so that material does not return to black oxide form. In high-concentrate bay, a firing at 3100°F, in cracked ammonia atmosphere, produces sintered or high-fired material for use in matrix-type fuel elements.

Plant can produce concentrations and forms to meet variety of customer requirements. Crystal size can be varied by careful control of pH and other conditions during hydrolysis and precipitation of diuranate. A further control on final product form is choice of correct size of grind before final firing.

(Please turn to page 84)



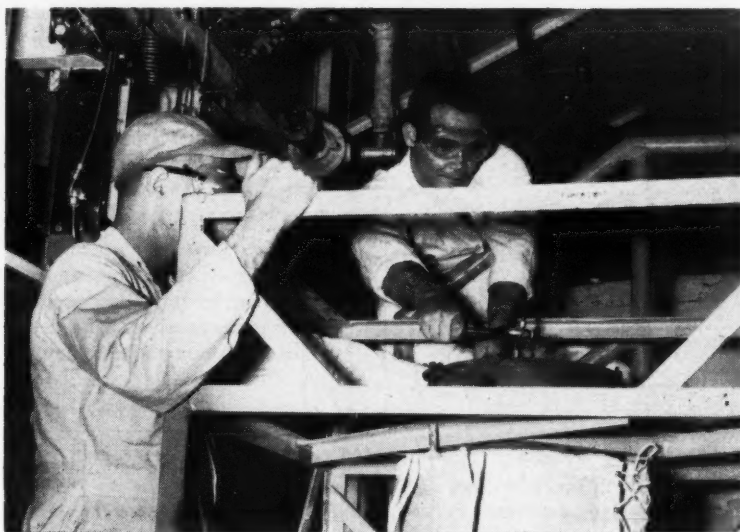




Infrared lamps and electric heating mantle maintain correct temperature of  $UF_6$  being fed to high-concentrate uranium oxide process

All dust is exhausted from "dry boxes", collected, and recovered. Note wide spacing of individual steps in high-concentrate production, as dictated by plant geometry which assures safe operation

Cylinder of  $UF_6$  being connected to Monel lines that will carry it to hydrolysis stage of process in low-concentrate bay. Lines have low-pressure steam tracing to maintain correct line temperature

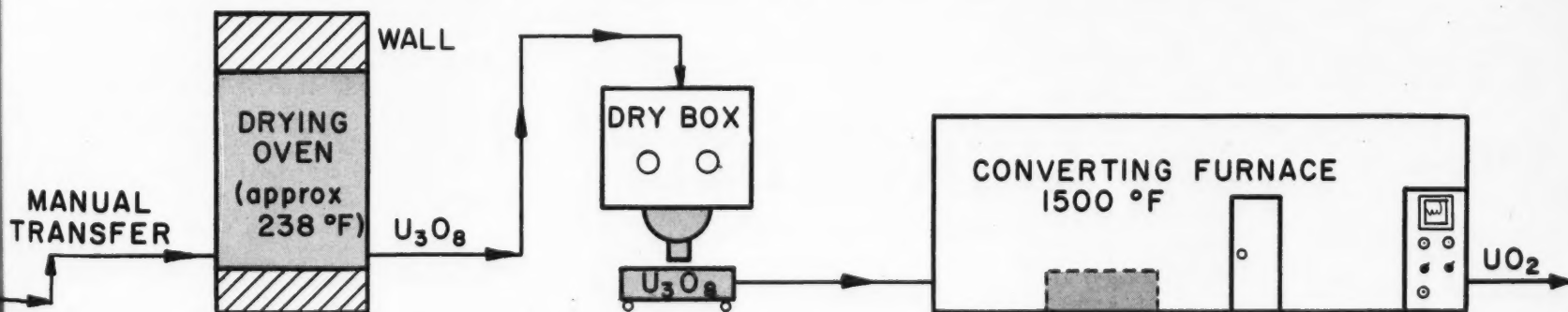


CP Staff Photo

Outline of process for producing low-enrichment  $UO_2$  from  $UF_6$  at Mallinckrodt, Hematite, Mo.

TO TANK

CAKE



# How the LINK-BELT Roto-Louvre dryer guards your product quality and cost control



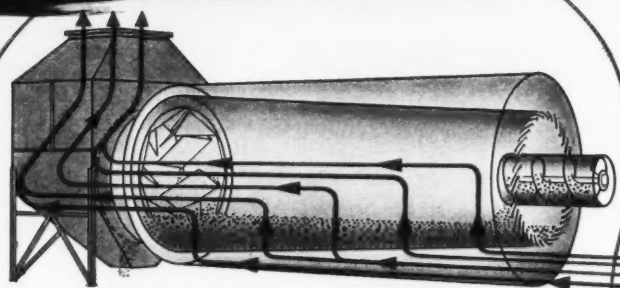
Roto-Louvre, shown in magnesium sulphate production, permits shorter retention time for material in drum . . . needs only half the floor space required by other designs.

*Provides gentle pre-drying, drying or cooling with laboratory accuracy*

THE dangers of overheating or degradation of your product make the drying cycle a key element of your quality and cost control system. Duplicate the pre-forming of your laboratory operation with a Link-Belt Roto-Louvre dryer.

This compact, highly effective machine introduces dry, heated air through ever-changing channels reaching the entire surface of every particle. Stratification and segregation—resulting in an irregular, overdried or underdried product—are prevented.

For a complete report on Roto-Louvre's remarkable efficiency, send for Book 2511. Or, if you prefer to send us a sample of your material, we can work out drying, cooling or roasting procedures you can duplicate in your own plant . . . using the right dryer from the broad Link-Belt line.



**Common-sense design assures effective heat transfer**

Roto-Louvre has largest volume of air penetrating thin bed of material near feed end, where greatest evaporation must take place. As material moves forward and bed becomes thicker, smaller air passages reduce vol-

ume of air passing through bed, preventing overheating. Precise control of input air temperature, exhaust and conditions of material travel assures maximum heat transfer per cubic foot of air.

## LINK-BELT

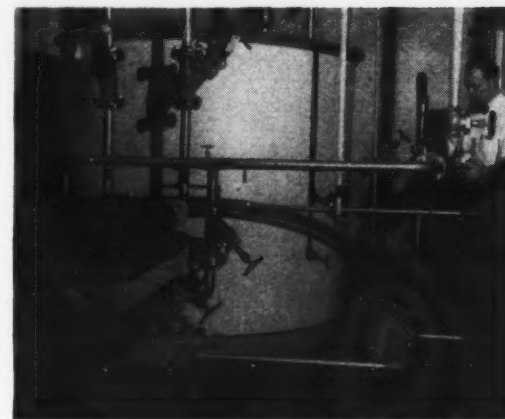
DRYERS • COOLERS • ROASTERS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World

## IDEAS

### Enriched Uranium Oxide

(Continued from page 82)



CP Staff Photo

Low-concentrate line uses conventional processing equipment to handle "always-safe" batches

In high-concentrate processing bay, equipment design and placement, and handling techniques are dictated by characteristics of nuclear material. To prevent any possibility of reaching critical mass and initiating a chain reaction (material will not explode but will react with very high heat), certain limits are considered as maximum (see table). By keeping below any one of these limits a chain reaction is prevented.

In actual operation, two or more limits are used. All piping is less than five inches diameter, including sintered stainless steel filter discs. Ovens and firing furnaces are equipped with slotted metal shields so that material-containing trays, sized less

### Always-safe Limits

At Mallinckrodt, these figures were used as design limits for processing equipment handling U-235 at about 90% enrichment. For other enrichments, other values must be calculated.

Mass, g	800
Volume, liters	6.3

Any quantity of mass or volume below these figures will not sustain a chain reaction.

Cylinder diameter, inches	5.0
---------------------------	-----

Solutions may be safely processed and stored in vessels and piping having indicated inside diameter. Safety is imposed by diameter alone. Container may be of any length, containing any mass, at any chemical concentration.

Slab thickness, inches	1.4
------------------------	-----

Slab-like volumes of infinite extent will be subcritical at this thickness.

Concentration, g/liter	11.6
------------------------	------

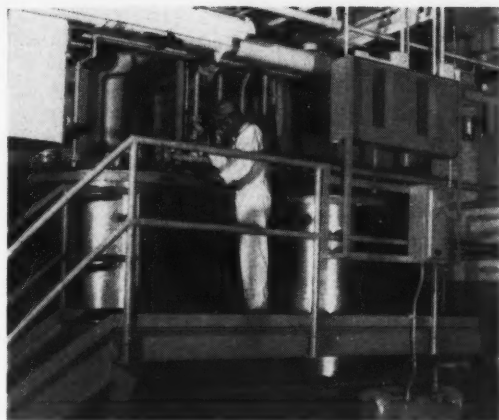
Aqueous solutions having concentrations below value shown cannot be made critical.

LINK-BELT COMPANY  
Prudential Plaza, Chicago 1, Ill.  
Please send me 20-page Roto-Louvre Book 2511.  
Name .....  
Firm .....  
Address .....  
City..... Zn.... State.....



When inquiring check 1114 opposite last page





CP Staff Photo

Holding tanks for all filtrate and wash water. Uranium content is checked and proper processing determined to prevent stream pollution or product loss.

than critical slab thickness, cannot be stacked more than one high. Even size of columns use to aspirate enclosed processing areas is regulated to conform with cylinder size limits. Batch size is strictly limited to "always safe" mass, by weight and volume measurements and calculation of amount of ammonia consumed.

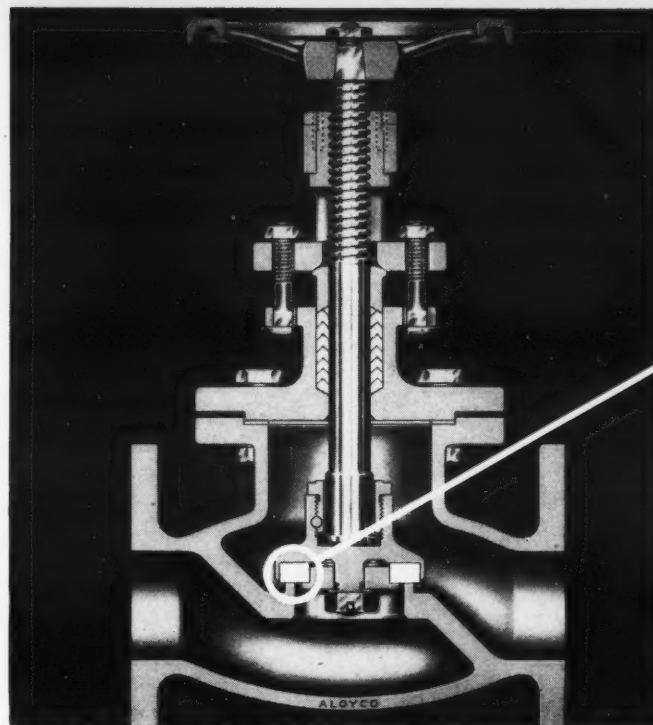
**Low-concentrate batches** can range from 50 to 350 lb of final product. The  $UF_6$  is received in "always safe" size from AEC. However, material is weighed into the process, measured volumetrically with a rotameter, and amount of ammonia consumed in first step titrated to determine that U concentration does not exceed amount specified. Remainder of this operation is carried out in conventional processing equipment.

(Please turn to next page)



CP Staff Photo

"Bird cage" shipping framework assures safety in handling final product. Regardless of stacking, critical conditions cannot be obtained.



150 LB. ALOYCO GLOBE VALVE features bolted bonnet, and outside screw and yoke construction which keeps stem threads out of contact with corrosive fluids. Two piece gland plates and followers. Sound, heavy section body and bonnet castings. Stainless bolts. Heavy finished stem. Renewable yoke bushing. Flanged or screwed ends.

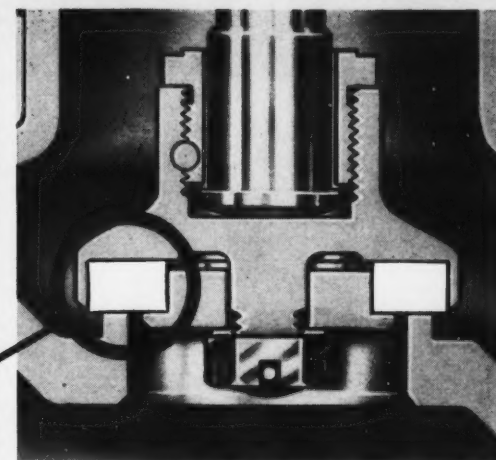
## Tips on selecting valves to combat oxidizing solutions

High chromium and chromium-nickel stainless steels are the best alloys for these corrosive applications.

When exposed to oxidizing solutions they form protective films which restrain corrosive attack. Alloyco 18-8S, 18-8S mo and Alloyco 20 are good examples.

Valves should be constructed so that slight wear or corrosion won't require costly valve replacement. Renewable seats or discs shown above are one answer to this problem. So are deep stuffing boxes and outside screw and yoke construction. And, of course, all valve parts that come in contact with the corrosive fluid should be alloy steels.

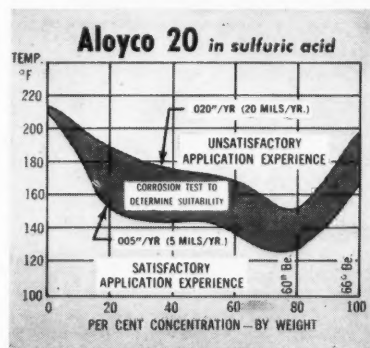
6.18



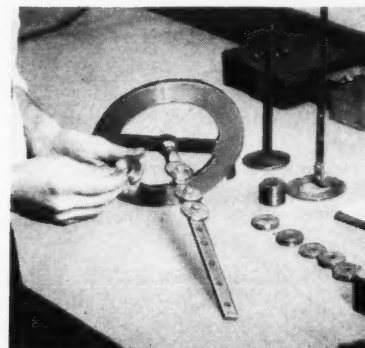
RENEWABLE TEFLON DISC is fully retained in disc holder so that even heavy overloads can't force it out of place. Machined seating surface assures wide full contact with disc and protects against distortion. Teflon V-type chevron packing rings are also used in deep stuffing box.



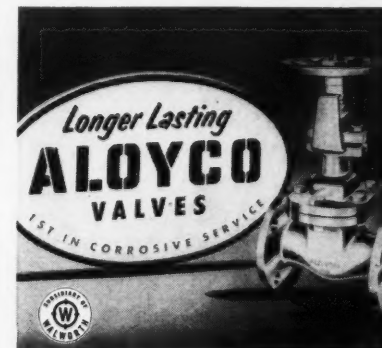
ALOYCO STAINLESS STEEL 18-8S (type 304) is expressly suited for resistance to oxidizing solutions. It also lends itself to innumerable other applications to prevent product contamination or discoloration. In Alloyco 18-8S mo (type 316), molybdenum is added to increase resistance to attack by pitting.



ALOYCO 20 provides a high order of corrosion resistance to a wide range of sulfuric acid concentrations at varied temperatures as indicated by the graph above.



ALOYCO TECHNICAL SERVICE includes engineering counsel, metallurgical assistance and field service. Samples are being prepared for plant line test above.



FOR FURTHER INFORMATION on Alloyco corrosion-resistant valves, write to Alloy Steel Products Company, 1302 West Elizabeth Avenue, Linden, New Jersey.

When inquiring check 1115 opposite last page



## Enriched Uranium Oxide

(Continued from preceding page)

All waste such as filter-cake wash water, filtrate, and water from showers and basins in locker rooms is passed to a holding tank where it is checked for uranium content and processed to recover valuable material and remove all objectionable chemicals. A special sanitary sewage treatment plant prevents stream pollution.

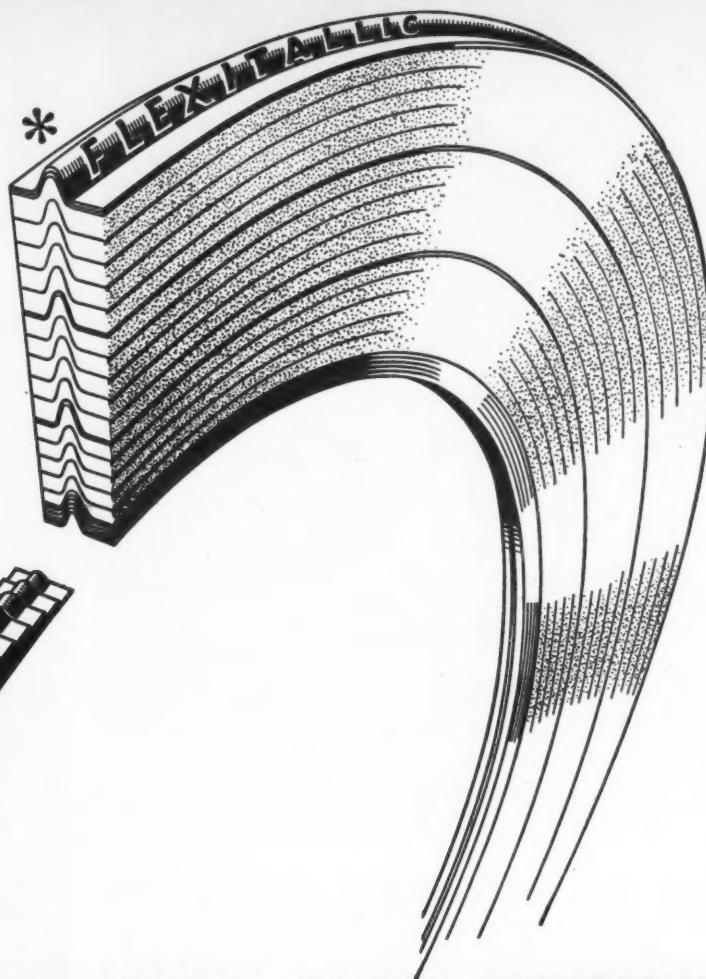
**Materials of construction** are as follows: Lines from  $UF_6$  cylinder to hydrolysis tank are Monel; holding tanks, low-temperature drying trays, and other lines are type 304L stainless steel; trays used for 1500°F firing and high firing are Inconel or molybdenum. Plate and frame filter press and diuranate holding tank in low-concentrate process are rubber-lined for flexibility to meet demand for other special materials required by commercial power industry.

Additional safety precautions are built into process through control panel board. If pressure of  $N_2$  used to sweep  $UF_6$  into hydrolysis stream drops too low, feed automatically stops. Temperature on electric heating mantle for  $UF_6$  cylinder is raised or lowered through panel board to maintain 2 psia in lines. If water aspirator pressure in hydrolysis step drops below a specified limit, all feed is stopped. Infrared lamps and low-pressure steam or electric tracing keep  $UF_6$  valving and transfer lines at 140°F to prevent solidification of gas.

Final products are shipped in special "bird cage" framework that prevents stacking in any way that will create critical conditions.



"By golly . . . looks like it really WAS sodium!"



## THE CHALLENGE OF THE BLUEPRINT

The engineer calculates stresses in high-pressure piping and designs for safety. To be sure of this safety he writes "Flexitallic" Spiral-Wound Gaskets on his drawings of the flange connections.

It is this confidence of the engineers — this challenge of the blueprint — that makes our job of maintaining Flexitallic standards of quality so important.

Each Flexitallic Gasket is designed to meet specific conditions of thermal and mechanical shock, corrosion, vibration, weaving, and to meet unpredictable joint stresses. Spiral-wound V-crimped plies of required metal with alternating plies of proper filler result

in a gasket with compression characteristics like those of a precalibrated spring.

Flexitallic Gaskets—for all pressure/temperature ranges from vacuum to 10,000 lbs., from extreme sub-zero to 2000°F. For all standard joint assemblies. In four thicknesses: .125", .175", .250", .285".

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**Flexitallic**  
SPIRAL-WOUND GASKETS

FOR PIPE FLANGES, PRESSURE VESSELS AND PROCESS EQUIPMENT

\*Flexitallic is a registered trade name. No one else can make a Flexitallic Gasket. Look for Flexitallic Blue—it's our exclusive blue-dyed Canadian asbestos filler

When inquiring check 1116 opposite last page

**New outlet for fly ash —  
substitute raw material  
in cement making . . .**

research shows it can replace shale or clay in ACL process

Pilot plant tests indicate that fly ash can be substituted for clay or shale as raw material for making portland cement by the ACL process. Conducted at pilot cement plant in Carrollville, Wisconsin (see *CHEMICAL PROCESSING*, August 1956, pages 64-66), the tests showed that substitution has little effect on the end product — a cement with low fuel requirements and dust losses.

Since the ACL system requires a pelletized feed, fly ash is ideally suited for the process. Carbon removal from the ash is accomplished with 200-mesh gyratory screens. Raw materials are blended and maintained in pellet form to assure uniformity of mix throughout the process.

Use of fly ash in cement production promises an important new outlet for large tonnages of the material. Announcement has been made that The Wisconsin Electric Power Company plans to supply about 50,000 tons per year to the first US full-scale ACL system now being built in Milwaukee, for Marquette Cement Company. Approximately 15 or 16 percent of the raw material feed will be made up of fly ash as substitute for shale.

(Cement research work was conducted by Allis-Chalmers Manufacturing Company, Dept. CP, Milwaukee 1, Wis. . . or check 1117 opp. last page.)

**Furfural refining unit treats virgin gas  
oil on West Coast . . .**

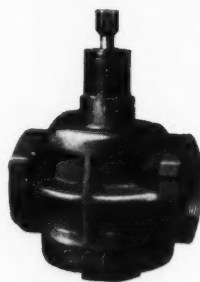
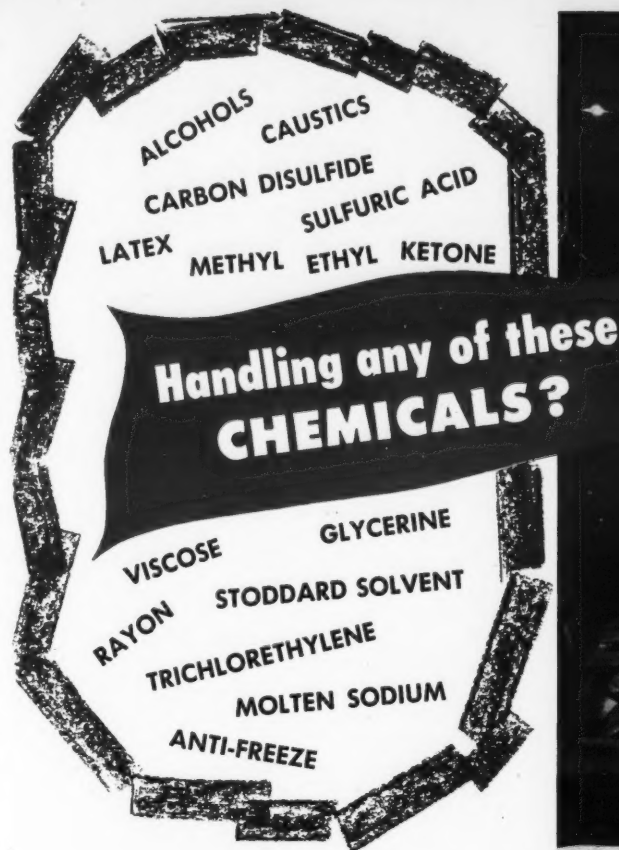
improves quality, yield of gasoline produced

Furfural refining unit for the treatment of virgin gas oil cracking stock is on stream in Los Angeles. Plant has gas oil charge of 25,000 bbl per operating day. Process gives yield of about 94 percent raffinate, which is charged to fluid catalytic cracking unit.

Process improves both the quality and yield of gasoline produced in the catalytic cracker by decreasing sulfur content of the virgin gas oil, extracting metal contaminants, and reducing the aromatics content. Operating costs are cut, due to longer catalyst life.

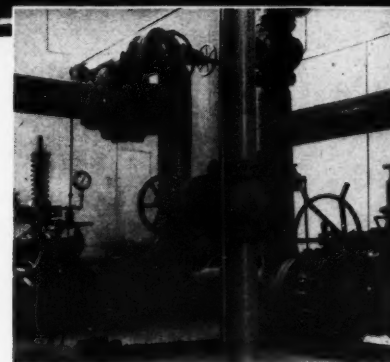
Licensed by the Texaco Development Corporation, the furfural refining process has been used in the past for refining lubricating oils. The West Coast installation is the first to treat virgin gas oil to prepare it for subsequent cracking. Extractions are done with centrifugal units instead of packed towers.

(Furfural refining process was developed by The Texas Company, Dept. CP, 135 E. 42nd Street, New York 17, New York.)



**QCF LUBRICATED PLUG VALVES** are successfully meeting the requirements of all of these chemical services. Their cylindrical plug with round or rectangular port is non-wedging, non-sticking . . . has the same area opening as the pipe. Their quarter-turn, quick opening and closing assures positive, precise flow control.

**QCF Valve Lubricants** are specifically compounded for the commodity handled. Years of research and experience have proved the importance and value of the right lubricant for the right valve service.



If you are handling these or other chemicals, **QCF Valves** and **QCF Valve Lubricants** may be the answer to your valve requirements. Ask your W-K-M representative for specific information on your valve requirements.

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RETURN BENDS  
AND FITTINGS**

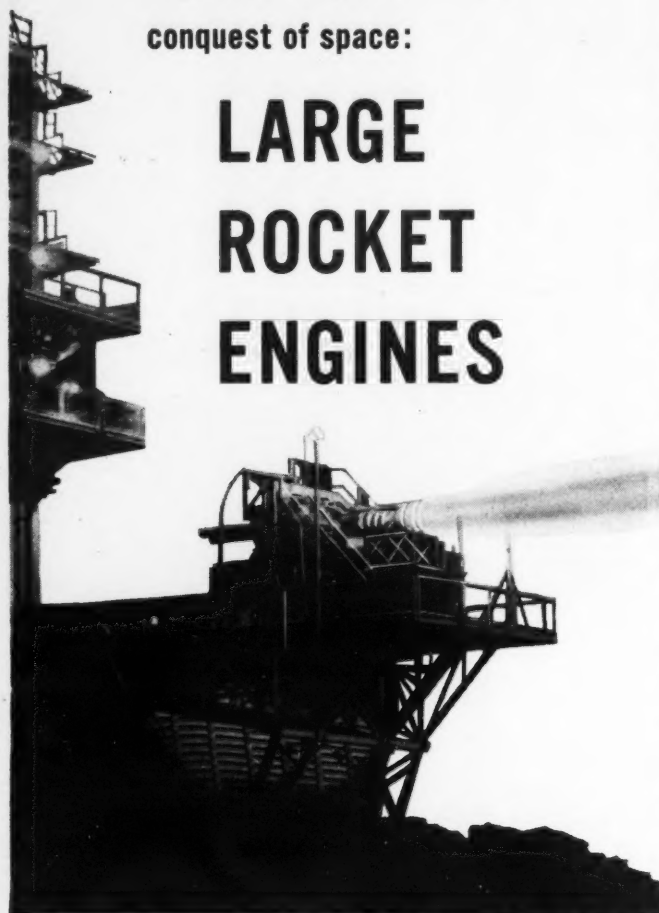
When inquiring check 1118 opposite last page



# Wanted: Pioneers for man's last frontier

Help us build power for the conquest of space:

## LARGE ROCKET ENGINES



**WILLIAM J. CECKA, JR.**, 35, aeronautical engineer, (Univ. of Minn. '43), was called from North American by the Air Force for experimental rocket work in 1944. On his return, he progressed rapidly: 1948, supervisory test job; 1950, group engineer, operations; 1953 engineering group leader; 1955, section chief of engineering test. Using our refund plan, he has his M.Sc. in sight.



**GEORGE P. SUTTON**, in the 13 brilliant years since receiving his MSME, Cal Tech, has made rocketry a way of life. His reputation is world wide. His book *Rocket Propulsion Elements* is recognized as the standard text on the subject. Still active academically, but no bookworm, he takes time off occasionally to study the laws of motion at some of the world's better ski resorts.

Tomorrow's count down already fills the air at ROCKETDYNE's 1,600-acre Field Test Laboratory in the Santa Susana Mountains near Los Angeles. For this is the free world's largest workshop for rocket engineering—the great new industry that is now attracting many of the finest scientific and engineering minds in the country.

### EXACTING RESEARCH, EXCITING PROSPECTS

From the rock-bedded test stands come 2 miles of recordings per day—data far ahead of available texts. The big rocket engine is a flying chemical factory in an absolute state of automation. It tolerates no error. It demands ductwork, turbomachinery, pressure chambers, orifices, injectors, heat exchangers and closed-loop control systems that must put hundreds of pounds of precisely mixed propellants into controlled combustion every second. Tolerances go down to 0.0001". Temperatures range from -250° F to 5000° F. Process time constants occur in "steady state conditions" of the order of a few milliseconds. Event sequences are minutely evaluated, as basis of designed performance predictions of extreme exactitude.

The methods now being developed at ROCKETDYNE for producing effective power to the limits of mechanical stress will have wide application. Such experience is practically unobtainable anywhere else. As a graduate engineer, you may be able to participate—now.

What motivates a rocket engineer? Well, the material advantages are high; but it is the work itself that draws him most. He feels the same incentive that moved Magellan... spurred the Wright Brothers... and beckoned again to Goddard as he flew the first liquid rocket at Auburn, Mass. in 1926.

At ROCKETDYNE, you can do this kind of pioneering in a management climate that stimulates personal growth—and rewards it to the limits of your ability. Academically, too, you can grow with our financial aid; some of the nation's finest universities are close by.

**INTERESTING BOOKLET:** "The Big Challenge"—facts on design criteria and development approaches used at ROCKETDYNE. Write for your personal copy, specifying your degree and years of post-college experience. Address: A. W. Jamieson, Engineering Personnel Dept. I-CP, 6633 Canoga Ave., Canoga Park, California.

## ROCKETDYNE

A Division of North American Aviation, Inc.

**BUILDERS OF POWER FOR OUTER SPACE**

When inquiring check 1119 opposite last page

### IDEAS

## Automation speeds computations of complex pipe systems

Complete systems worked out in single day, actual calculations take less than an hour

New method of performing pipe design computations makes it possible to work out complex high-temperature and power-plant pipe system calculations quickly and accurately. Worked out by Blaw-Knox Company in cooperation with Arthur D. Little, Inc., method eliminates delays by taking advantage of the high speed and accuracy of electronic computers. Known as the "6x6" Flexibility Matrix Method, process is available for use by consulting engineers and companies and individuals responsible for the design of such pipe systems.

High-temperature process and power-plant pipe systems are posing some of the most complex problems that engineers are called upon to solve. Operating conditions of 1000°F and 2000 psi are now quite common. Pipe may expand more than 9" in 100' under these conditions. Such expansion puts considerable force and stress on the pipe and associated



Actual computations for designing complete high-temperature pipe system take less than one hour on electronic computer. Tapes for collecting coded results are shown on machines at right

equipment. The system must be designed to be flexible so that there is no concentration of stress at any point. The complex design computations involved have taken skilled stress analysts as long as a month or more to complete in order to satisfy ASME code requirements.

With the new method, actual machine part of the computation takes less than one hour. Total time required for most jobs is about one day. This includes putting data on tape, checking accuracy of a printed transcription, putting tape through computer, and transcribing computed results into orderly tabular figures.

Data fed into the computer consist only of dimensions taken from an isometric drawing of the pipe



system, and a few physical properties of the pipe material. These are tabulated on simple forms from which the figures can be fed onto magnetic tape or other suitable input medium.

All results are carried to six significant figures. Inconsistencies in input data are detected by computer, which will inform operator of the error and, if permitted, will substitute correct dimension automatically. Accuracy is limited only by accuracy of input data. No short-cut approximations are made because all complicating factors and special variables can be taken fully into account.

Pipe system complexity is unlimited. Any number of anchors and restraints can be included. Out-of-plane bends offer no problem. The number of free ends and junctions has no effect on accuracy or efficiency of machine analysis. Floating headers are taken into account, and looped systems are included too.

(Information courtesy of Blaw-Knox Company, Dept. CP, 300 Sixth Avenue, Pittsburgh, Pa.)

#### Film designed to promote interest in technical careers

Prepared as part of campaign to interest more young people in following technical careers, 20-minute, sound-color film describes role of scientists and engineers in the oil industry, and outlines opportunities which exist in the field.

"Fashioning the Future" is available by letterhead request to Director of Public Relations, Universal Oil Products Company, Dept. CP, 30 Algonquin Road, Des Plaines, Ill.



## PROTECTIVE'S



all styles, all sizes,  
produced with fine materials:  
Polyethylene, Vinyl, Laminates  
and other flexible films —  
all at surprisingly LOW PRICES!



*\*Double-Seal Guaranteed Safety...*

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engineered and  
manufactured by the process  
in plastic films for  
steel drums, lines, containers,  
casks and boxes —  
unusually tested and proven  
satisfactory for protective  
lining by many of  
America's leading  
manufacturers, processors  
and laboratories.

More than 100 years of protective lining.

Alfred Chemical & Supply Co.  
The Borden Company  
Bostwick National Laboratories  
C.R.T. Co. Inc. (Canada Company)  
E. I. du Pont de Nemours & Co.  
Eastman Chemical Corp.  
General Electric Company  
Hoffman & La Roche Inc.  
National Lead Company  
Olin, John & Co., Inc.  
Smith & Wesson  
Union Carbide & Carbon Corp.

International Association  
Fire Protection  
Fire Insurance

Write Dept. CP-17

## PROTECTIVE LINING CORPORATION

GENERAL OFFICES AND PLANT: 22 WOODHULL STREET, BROOKLYN 31, NEW YORK

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# LEE

## CORROSION-RESISTANT PROCESSING EQUIPMENT

IS  
PRECISION BUILT  
TO YOUR  
SPECIFIC  
REQUIREMENTS  
TO GIVE  
LONG YEARS OF  
PEAK PERFORMANCE  
WITH  
LOW MAINTENANCE

Mixing Tank  
25 to 500 gal.

Pulp Tank  
500 to 2,000 gal.

Storage Tank  
100 to 5,000 gal.

LEE METAL PRODUCTS CO., Inc.

Phillipsburg, Pa.

## IDEAS

### Pharmaceuticals sterilized by "soft" X-rays . . .

tests show that radiated compounds do not lose potency by treatment

Experimentation with low-voltage radiation indicates that "soft" X-rays may provide a commercially economic sterilization method for pharmaceuticals, foods, and other materials. Among the products treated in the course of experiments at Battelle Memorial Institute, Columbus, Ohio, are penicillin, vitamin B<sub>12</sub>, and riboflavin. Each of these compounds was sterilized without loss of potency.

The unit used in the work is composed of conventional transformers and a prototype X-ray tube with a beryllium window. Window transmits the longer, soft X-ray, wave lengths. Tube operates at 60 kv and 200 ma.

Device is designed for continuous operation on existing production lines and requires only one non-technical operator.

Compared with diagnostic X-rays, soft X-rays are characterized by lower penetrating power, higher flux density, and longer wave length. Commercial X-ray units are generally built to operate at voltages ranging from 250,000 v to one-million v. Soft X-rays are low-voltage radiation produced by units operating in the approximate range of 2500 to 250,000 v.

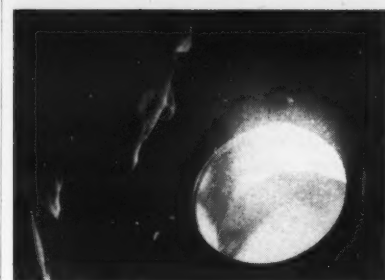
(Low-voltage X-ray tube used in experiments was supplied by Machlett Laboratories, Dept. CP, Springfield, Conn. . . . or for more information check 1122 on the convenient Reader Service slip which is located opposite last page.)

### NBS develops simple, rapid method for burning combustible materials under controlled conditions . . .

permits quantitative estimate of combustion gases produced from organic coatings, compounds

Recently developed method of burning organic materials is providing useful information for selection of organic coatings for use in buildings and other structures. Developed by the National Bureau of Standards, process is simple and quick. Results give a quantitative estimate of combustion gases produced from such organic coatings as paints, asphalts, and plastic compounds. Information is particularly useful with respect to thermal breakdown properties. New method replaces costly and time-consuming laboratory procedures previously used.

Process provides a quick and comprehensive analysis of gases produced by combustion as well as close control of ratio between air volume and specimen weight at any initial firing temperature up to 550°C. Equipment consists essentially of a combustion



### To see what's going on inside

When you want to look into a furnace, watch acid eat its way into metal, observe a white hot melt in cool comfort, there's only one answer . . . GLASS.

**PYREX brand PLATE GLASS No. 7740** is particularly suited for odd-sized sight glasses, fume duct windows, and chemical-resistant surfacing. You can use it for temperatures up to 900° F. It is resistant to thermal shock and indifferent to chemical attack.

**VYCOR brand FLAT GLASS No. 7900** has such resistance to thermal shock that you can use it with continuous temperatures to 1450° F., intermittently at 2210° F.; for high-temperature furnaces and tanks.



**PYREX brand INFRARED-REFLECTING GLASS** reflects radiation in the infrared spectrum but transmits up to 75% of visible light. Useful as an efficient shield to protect workmen from exposure to intense heat radiation.

**CORNING HEAT-RESISTANT BLUE OBSERVATION GLASS**, reduces glare when observing flame, smoke and ash intensity in power plants, marine boiler stations and the like.



Let us send you a copy of Bulletin PE-34 which describes the properties, specifications, and applications of these Corning Flat Glasses.



Corning means research in Glass  
**CORNING GLASS WORKS**  
CORNING, N. Y.

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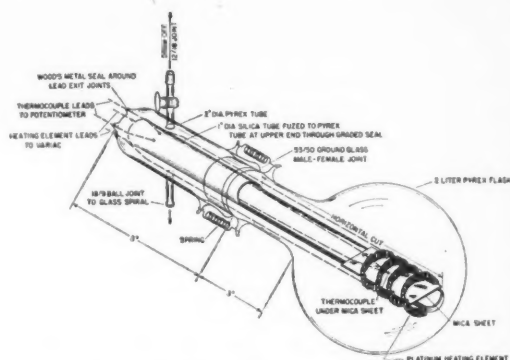
When inquiring check 1123  
opposite last page

CHEMICAL PROCESSING

When inquiring check 1121 opposite last page



In use, a porcelain boat containing the sample is placed in tube as far from heating coil as possible.



Combustion chamber used for studying combustion gases produced by burning organic materials

Current is applied to coil until desired firing temperature is reached. At this point, combustion chamber is inclined, causing boat to slide down silica tube into coil. After combustion is complete, current is turned off and apparatus is permitted to cool to room temperature. Gases can then be analyzed by a mass spectrometer.

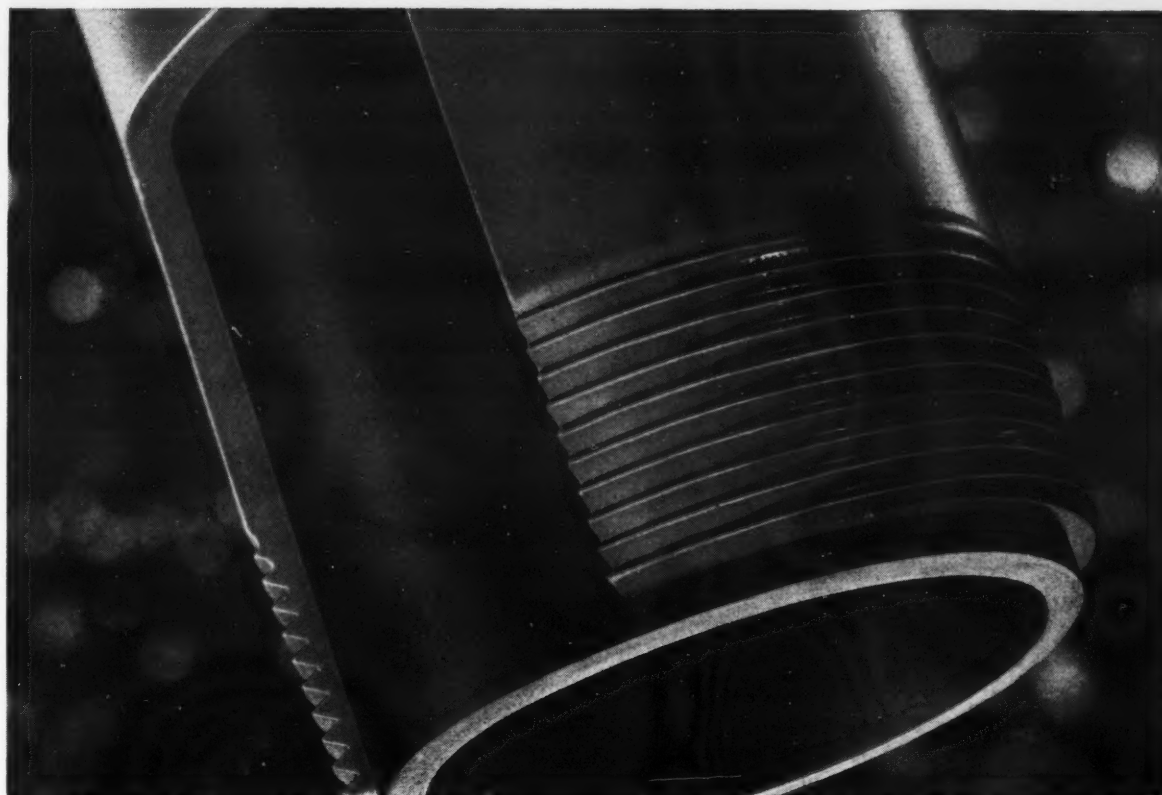
(Information courtesy of National Bureau of Standards, US Department of Commerce, Washington 25, D. C.)



You and other key processing people like you are hand-picked to receive **CHEMICAL PROCESSING**. It's edited for you alone . . . sent to you without subscription charge.

How does this benefit you?

**See page 93**



# You can see why Saran Lined Pipe cuts corrosion costs

**It's made of corrosion-resistant saran swaged into rigid non-bursting steel . . . liquid never touches metal in these installations**

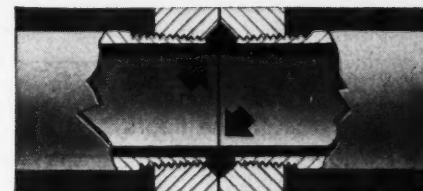
Here's your best way to convey acids, alkalis and other corrosive liquids—saran lined pipe, fittings and valves. This modern piping is corrosion resistant... forms snug, leakproof joints... is available for working pressures up to 150 psi. Fittings and valves are also available in steel for working pressures to 300 psi.

Installation costs are low with saran lined pipe, fittings and valves. Saran lined pipe can be cut and threaded in

*Saran Lined Pipe is Manufactured by  
The Dow Chemical Company, Midland, Michigan*

the field with available pipe-fitters' tools. Its rigidity means few supporting structures are needed.

Saran lined pipe has an outstanding record of trouble-free performance in the chemical, petroleum, waste, pulp and paper, metal finishing, and food processing industries. For further information send in the coupon at the right. THE DOW CHEMICAL COMPANY, Midland, Michigan.



Liquid never touches metal in saran lined pipe even at a flanged connection like this.

Saran Lined Pipe Company  
2415 Burdette Avenue  
Ferndale 20, Michigan  
Dept. SP625B

Please send me information on saran lined pipe, valves and fittings.

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

**YOU CAN DEPEND ON**

DOW

When inquiring check 1124 opposite last page

## Refractory Castables are **SPECIALIZED**

# Which are best to use in refinery units?

Naturally, the type of refractory castable selected depends upon the specific service. B&W makes a line of specialized refractory castables which are being widely used in catalytic reformers and catalytic cracking units, as well as in furnaces, ducts and stacks. For easy reference, here are some typical applications together with the recommended B&W Refractory Castables:

APPLICATION	DESIRABLE PROPERTIES	RECOMMENDED B&W CASTABLES
Lining of catalytic reformers	Extremely low iron content, extra high strength. Extremely low iron content, plus good insulation. Low iron content, high temperature use limit.	Kaocrete LI Kaolite LI Kaocast
Lining desulphurizers	Good workability	Kaocrete B
Transfer lines and regenerators of catalytic cracking units	Extra abrasion and erosion resistance.	Kaocrete D
Heads of reactors and regenerators	Plasticity, excellent workability.	Kaocrete B
Insulating furnace floors	Good insulation, light weight	Kaolite-20 Kaolite-22
Tube sheets	Good insulation, light weight	Kaolite-20 Kaolite-22
Burner blocks	High temperature use limit, refractoriness and spalling resistance.	Kaocast
Openings where doors and other points are subject to mechanical abuse	Extra abrasion and erosion resistance	Kaocrete D
Furnace doors	Good insulation, light weight	Kaolite-20 Kaolite-22
Ducts and stacks	Good insulation, light weight	Kaolite-20

Bulletin R-35 contains additional information on  
B&W Refractory Castables. Send for your copy.

**B&W REFRACTORIES PRODUCTS:** B&W Allmul Firebrick • B&W 80  
Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W  
Refractory Castables, Plastics and Mortars • B&W Silicon Carbide



## IDEAS

### Uranium purified through use of zone refining . . .

method provides simple means  
of purifying for lab use

In routine use as a method for preparing high-purity germanium, zone refining (see *CHEMICAL PROCESSING*, Sept. 1955, pages 96-97) is now providing a simple means of purifying uranium for research purposes. By causing a molten zone, created by induction heat, to move slowly along a uranium bar, extensive purification is achieved by removing boron, iron, nickel, and other impurities.

Effectiveness of technique is indicated by fact that nine zone passes can result in a concentration of 15 parts of iron per million of uranium at one end of bar, and 200 ppm of iron at the other end. Additional passes produce even better results.

(Uranium purification work is being conducted by Sylvania Electric Products Inc., Dept. CP, 1740 Broadway, New York 19, N. Y.)

### AEC extends contract with National Lead

The National Lead Company of Ohio, a subsidiary of the National Lead Company, will continue to operate the AEC's Feed Materials Production Center at Fernald, Ohio, until June 30, 1961. Original contract, scheduled for expiration June 30, 1957, has been extended four years — with an annual estimated operating cost of \$38 million. The installation is a completely integrated series of plants for converting uranium concentrate into highly pure uranium metal.

(Information courtesy U. S. Atomic Energy Commission, Dept. CP, Oak Ridge, Tenn.)

For more information on product at left, specify 1125 . . . see information request blank opposite last page.



## Why were YOU selected to receive CHEMICAL PROCESSING?



... why aren't you required to pay  
for your subscription?

A well-edited business magazine reflects the interest, needs, and caliber of its specialized readers. Visualize, if you will, a magazine intended for auto mechanics devoting space to articles about gardening . . . or an interior decorator's magazine running articles about hot-rod racing.

Obviously, the mechanic and the decorator would soon lose interest . . . since their magazines would not be paying attention to their particular on-the-job needs.

In a less obvious way, perhaps, something similar can take place if the circulation of a publication gets "diluted" with many "readers" who are not intimately concerned with the specialized field the magazine is intended to serve.

**This could happen if a magazine were sold to "just anyone with the subscription price".**

The editor of a magazine having such a "diluted" circulation would labor under a handicap. He would feel the need to serve all his readers, whose jobs and problems run the gamut from top to bottom of his industry (and other industries as well). Inevitably, his articles would be "over the heads" of some readers and beneath the interests of others. The result? A "hodge-podge" that wouldn't really satisfy any reader.\*

Fortunately, the editors of CHEMICAL PROCESSING do not labor under this yoke. Our circulation is "controlled." There is no subscription charge.\*\* Readers are handpicked according to strict qualifications, taking into account their firm, function, and title. We, as editors, know our audience as specialized readers concerned with processing and closely related functions in the chemical and allied processing industries . . . men who want to know the practical slant on methods, ideas, materials, and equipment they can use in solving their everyday plant problems. And so, CP is not geared for students, beginners, and others who have little or nothing in common with these men.

Because we control circulation CHEMICAL PROC-

ESSING articles can be prepared with the confidence that all readers have a high degree of professional competence and a considerable background of successful experience. We can, therefore, dispense with the tedious repetition of "stage-setting" phrases and explanatory passages necessary when writing for a heterogeneous audience. We can get right to the heart of our subject matter . . . making for shorter stories, faster reading, more useful ideas per reading minute.

**You may ask . . . "How do you know these people are actually reading your magazine?"**

Reader response is the answer. Each month, thousands of readers, after reading the articles and advertisements in CP, use the Reader Service slip (opposite the last page of each magazine) to get further specific information to meet their specific needs. A check on these slips as they arrive in our office tells us the type of readers who are **actually reading and using CP** . . . and indicates what they are interested in. And the record shows that the processing man is the reader of CP.

Our column in the November issue (page 85) discussed our "audit of known readership" — an analysis, by titles, of readers responding to articles and advertisements in a specific issue. This audit corroborates the statement that CP is read and used by the men for whom it is intended.

**To sum up . . .**

A fully effective industrial magazine must 1) strictly define its audience, 2) make sure its circulation adequately covers that audience, 3) prevent "dilution" of circulation with names outside the defined audience, 4) publish only those articles that will help readers in that audience in their work, and 5) check often to be sure this audience is **really** reading the publication.

Controlled circulation is our choice as the best way of meeting these requirements. That's why we use it — to serve you, and more folks like you, with a more useful publication.

**The Editors  
of Chemical Processing**

\*General or "mass" magazines do not have this problem of "handpicking" special readers. They simply serve people as people. So paid circulation methods are practicable for them.

\*\*As CP renders a public service, men outside the orbit of

the special field served may buy CP at \$1.00 a copy, or \$10.00 a year. Such paid subscriptions are few in number . . . they are not included as "chemical processing" circulation on BPA Audit Reports.



## Free Booklet

The story of metal contamination and what you can do about it is clearly explained in this helpful booklet. Sources of metal contamination and methods of detecting tramp metal in different types of conveying equipment are described in concise terms. You'll discover an easy way to protect against costly and embarrassing damage claims, to maintain purity, to avert harm to plant machinery. Mail coupon below for your free copy.

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**Please send me your new booklet on the RCA Electronic Metal  
Detector, "Protect Product Quality."**

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COMPANY \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

When inquiring check 1126 opposite last page

## a big line of SMALL packless valves



Packless valves are designed for tough applications, like critical high vacuums, corrosive or dangerous fluids and high temperatures. Our experience with these problems has helped us to design a packless valve line broad enough to suit many of these applications. As evidence may we present:

**The 431 Series** - a greatly improved version of the Hoke brass bellows needle valve offering extended, leak-tight service life . . . suitable for sampling systems and analysis equipment—bronze bellows, stainless steel (blunt or vee) spindle in  $\frac{1}{8}$ " and  $\frac{1}{4}$ " pipe sizes.

**The 480 Series** - Globe or angle valves in brass or monel with phosphor bronze or monel bellows.

**The 440 Series** - for supercritical applications. An all stainless bellows valve with Teflon seat— $\frac{1}{8}$ " to  $\frac{1}{2}$ " pipe sizes. (Both 480 and 440 series have replaceable bellows assemblies.)

**The 411 Series** - All metal monel diaphragm valves with low internal volume and excellent service life.

For those of you who have special problems, modifications of these valves are available for high temperatures and pressures. You'll find us most receptive to your inquiries.

WE'VE JUST COMPLETED A NEW PACKLESS VALVE BULLETIN THAT WE'D LIKE TO SEND TO YOU. WRITE TO

**HOKE**  
HOKE INCORPORATED  
Fluid Control Specialists  
145 S. DEAN STREET, ENGLEWOOD, NEW JERSEY

When inquiring check 1127 opposite last page

- improves quality control
- automatically controls process

## and assures uniform viscosity in sizing

WILLIAM C. CLARKE, Assistant Editor  
with WILLIAM VAN VOORHIS  
Machine Coating Supervisor  
S. D. Warren Company, Cumberland Mills, Maine

**Problem:** Starch cooking by a time-temperature device at S. D. Warren Company, Cumberland Mills, Maine, resulted in viscosity variations as much as 600% (normal viscosity is 120-150 cp). Starch sizing produced by the time-temperature device was interfering, at times, with operation of paper coating machine—causing a non-uniform

coat and affecting weight and quality of paper produced. Heavy viscosity even caused malfunctioning of starch sizing pumps. If converted starch were thinned with water in order to pump, formulation was no longer in balance.

Approximately three years ago, S. D. Warren Company switched its formulations from pre-converted to pearl corn starch because of cost difference (approximately \$1.75 per 100 lb). Paper production required approximately five tons of starch every 24 hours.

**Solution:** In February, 1955, S. D. Warren Company installed automatic viscosity control



Recorder for viscosity control system

CHEMICAL PROCESSING

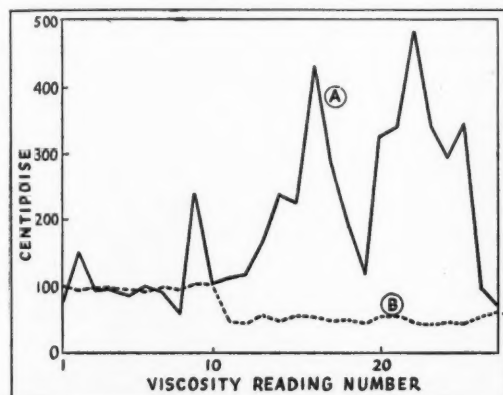


## instrumentation & control

# size preparation

system to prepare starch size. Cooking was placed under the control of this system so each batch is finished within required viscosity range. Installation included a 1000 gal tank to serve as cooker— together with a viscosity recorder-controller and a temperature recorder-controller.

(Please turn to next page)



Comparison of starch cooks. Use of time-temperature device resulted in (A). Automatic viscosity control resulted in (B)



Dumping pearl corn starch into cooker. Viscosity control element is at left (arrow)

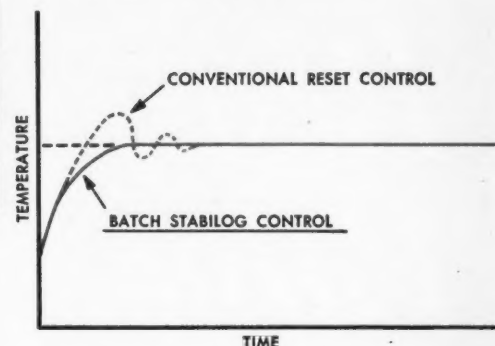
# Faster, safer start-ups for Batch Processes

no overshoot

no spoilage

no undesirable side-chain reactions

no explosion hazards



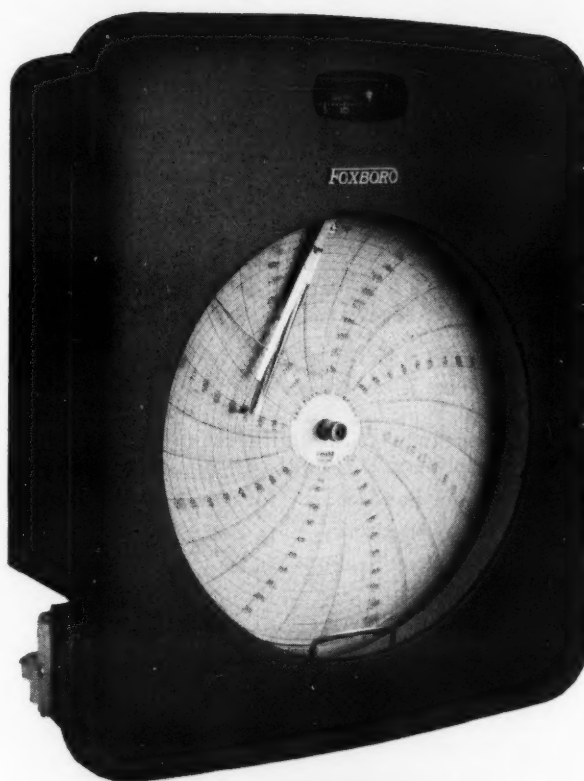
That's right! You can get rid of costly, dangerous temperature "overshoot" problems in batch processing! The Foxboro Batching Controller solves them. This versatile Controller brings temperature up to control point fast . . . stops it "on the nose" . . . keeps it there throughout the holding period. What's more, this fast "no overshoot" control doesn't compromise holding control . . . settings are made separately, for optimum results in both periods.

Here's how the Controller works. It starts the operating cycle by feeding maximum heat to the batch . . . brings temperature up fast. At desired distance below control point, adjustable "braking" action automatically slows temperature rise . . . levels it off smoothly at the control point. Simultaneously, the "balancing" action begins . . . holds control point setting exact . . . restores it even when upsets occur. At shut-down of process, the Controller automatically resets itself . . . ready for another precise performance.

Send for information today. (For batch operations requiring controlled rate of rise, write for data on Foxboro Cam-Set and Time-Cycle Controllers.)

The Foxboro Company, 811 Neponset Avenue, Foxboro, Mass., U.S.A.

FACTORIES IN THE UNITED STATES, CANADA, AND ENGLAND



**FOXBORO**  
REG. U. S. PAT. OFF.

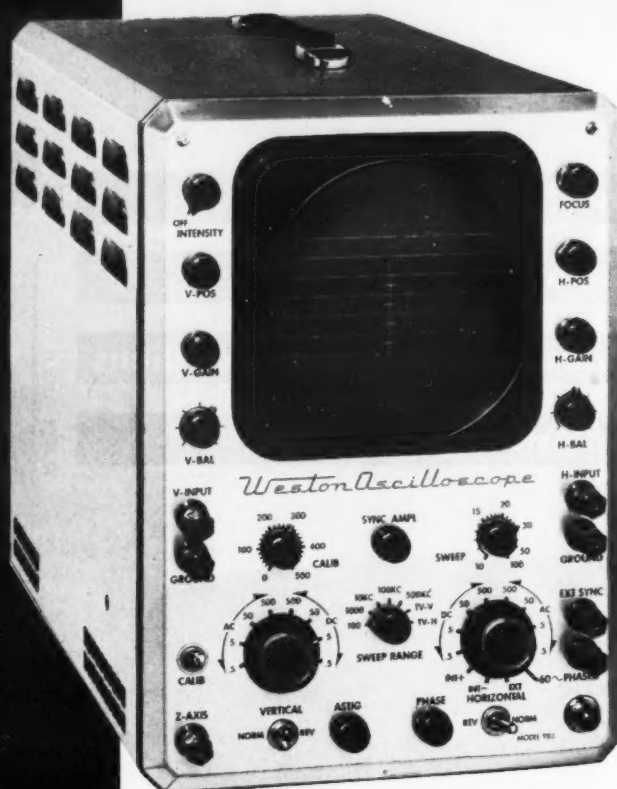
**CREATIVE INSTRUMENTATION**  
for Process Automation

When inquiring check 1128 opposite last page

# Best Value in all-purpose scopes

WESTON Oscilloscopes, and other Weston test equipment, are available through local distributors. For complete information, write Weston Electrical Instrument Corp., Newark 12, N. J.—A subsidiary of Daystrom, Incorporated.

DAYSTROM UNIT



## WESTON OSCILLOSCOPE

- identical vertical and horizontal amplifiers, D-C and A-C coupled.
- 4.5 mc band width (for color)
- 15 mv sensitivity
- normal or flat faced tubes (high intensity)
- Z-axis modulation
- 3X horizontal sweep expansion
- identical phase shift to 1 mc—can be adjusted up to 6 mc
- etched circuit construction
- ease of calibration
- polarity reversal switch
- only \$395.50 (with flat faced tube \$430.50)

**WESTON**  
*Instruments*

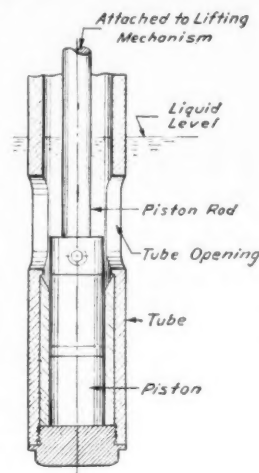
When inquiring check 1129 opposite last page

## INSTRUMENTATION & CONTROL

### Size Preparation

(Continued from preceding page)

Viscosity is determined by time required for piston to fall. Sample enters through tube opening



Once ingredients have been added to cooking vessel, complete cycle of conversion and then inactivation is initiated by manual pressing of start button. First stage of cycle—preconversion—is raising temperature of batch to approximately 150°F where it is maintained for a pre-determined length of time. Second stage—enzyme conversion—requires temperature be raised to approximately 170°F. Temperature is maintained until conversion is completed to a fixed viscosity—determined by viscometer. Third stage—inactivation—consists of again raising temperature to approximately 205°F as quickly as possible and then maintaining the temperature for sufficient time to inactivate the enzyme.

About every minute a starch sample is drawn into the measuring tube and its viscosity measured and recorded.

When the viscosity reaches the desired value, a signal from viscosity recorder-controller initiates the temperature controller. The temperature is then raised to the inactivating value and maintained for a period of time sufficient to destroy the enzyme.

The viscometer operates on a falling piston principle. A piston assembly as shown above is periodically raised by a lifting mechanism drawing a sample into the measuring tube. The sample goes down through the clearance between the piston and the inside of the tube, into the space formed below the piston as it is raised. The assembly is then allowed to fall by gravity, expelling the sample out through the same path as it entered. The time of fall is a measure of viscosity with the clearance between the piston and the inside of the tube forming the measuring orifice.

**Results:** Since installation of the automatic viscosity control system, S. D. Warren Company has found starch conversion to be more uniform than previously obtained. Viscosity variations have been kept within a  $\pm 15\%$  range. Machine coating of paper has become more uniform.

Maintenance has been relatively minor. (Most maintenance has been due to starch dust accumu-



## INSTRUMENTATION & CONTROL

lation on electrical contacts in recorder.) Sensing element does not plug up during periods of high viscosity.

S. D. Warren Company is planning to install an additional cooker in 1957. Instrumentation of the installation will duplicate present equipment.

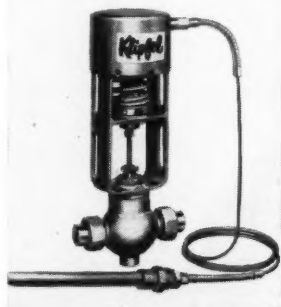
(Enzometer is product of Norcross Corporation, Dept. CP, 247 Newtonville Ave., Newton 58, Massachusetts . . . or for more information check 1130 on form opposite last page.)

### Self-actuated regulator for temperature control . . .

vapor pressure change within temperature-sensitive bulb controls flow through valve

**Uses:** As self-actuated temperature regulator for control of units heated by steam, water, or other fluids.

**Features:** Temperature regulator requires no compressed air, water, electricity, or other auxiliary power for its operation. Temperature-sensitive bellows cannot be overextended as it has overheat protection.



Bellows actuator and temperature sensitive bulb control valve opening of regulator

**Description:** Temperature regulator consists of bellows actuator connected by capillary tubing to temperature sensitive bulb. Actuator is mounted on top of yoke connected to valve.

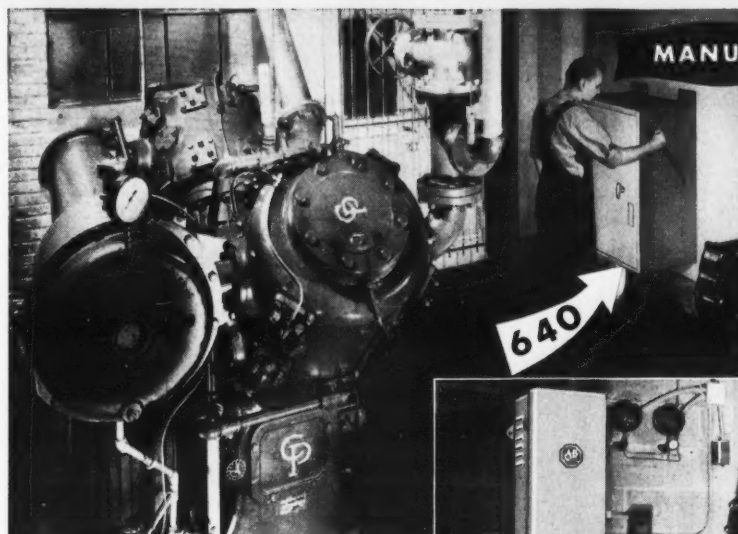
Bellows supplies

power for controlling valve opening in response to temperature changes at bulb.

Bulb is placed in tank or other location where desired temperature is to be maintained. Valve is installed in line supplying steam, water, or other fluid used for heating or cooling. Temperature change at bulb alters vapor pressure of bulb fluid. Pressure change is transmitted through capillary tubing to bellows actuator which changes valve opening to hold desired temperature.

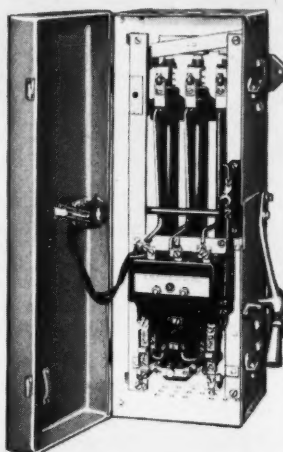
Setting scale attached to regulator yoke controls operational temperature. Regulator yoke is tubular design. Rigidity of yoke assures permanence of setting.

("Golden Genie" regulator is product of Klipfel Valves, Inc., Dept. CP, Hamilton, Ohio . . . or for more information check 1131 on form opposite last page.)

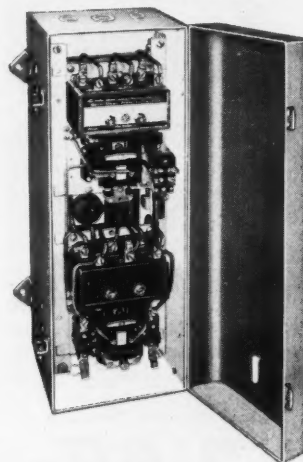


Large CP compressor equipped with Allen-Bradley Bulletin 640 resistance starter. Motor is speeded up by slowly raising starter lever. No current inrush—velvet smooth start.

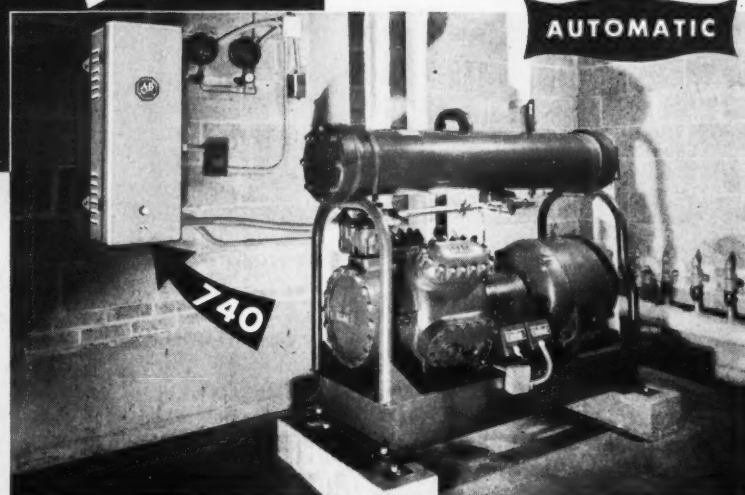
Trane air-conditioning compressor equipped with Allen-Bradley Bulletin 740 automatic resistance starter. Two-step starter smooths out current inrush—prevents lamp flicker.



BULLETIN 640 manual starter with cabinet open to show the three starting compression resistors.



BULLETIN 740 automatic resistance starter. Starting resistors are located behind the two contactors.



## EASY ON THE LINE... EASY ON THE MOTOR

No jerks or jolts—Satisfies the power company

Allen-Bradley compression resistance starters afford a neat solution for smoothing out the starting current and torque of heavily loaded squirrel cage motors. Graphite disc resistors, available only in Allen-Bradley compression starters, control the starting current and torque with velvet smoothness . . . and without lamp flicker.

These jerkless starters prevent damage or undue stress on belts, chain drives, or gears. They are equipped with dependable and accurate overload relays.

Available for squirrel cage motors up to 200 hp, 220-440-550 v. Send for Bulletins 640 and 740, today.

Allen-Bradley Co.  
104 W. Greenfield Ave.  
Milwaukee 4, Wis.

In Canada—  
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Galt, Ont.

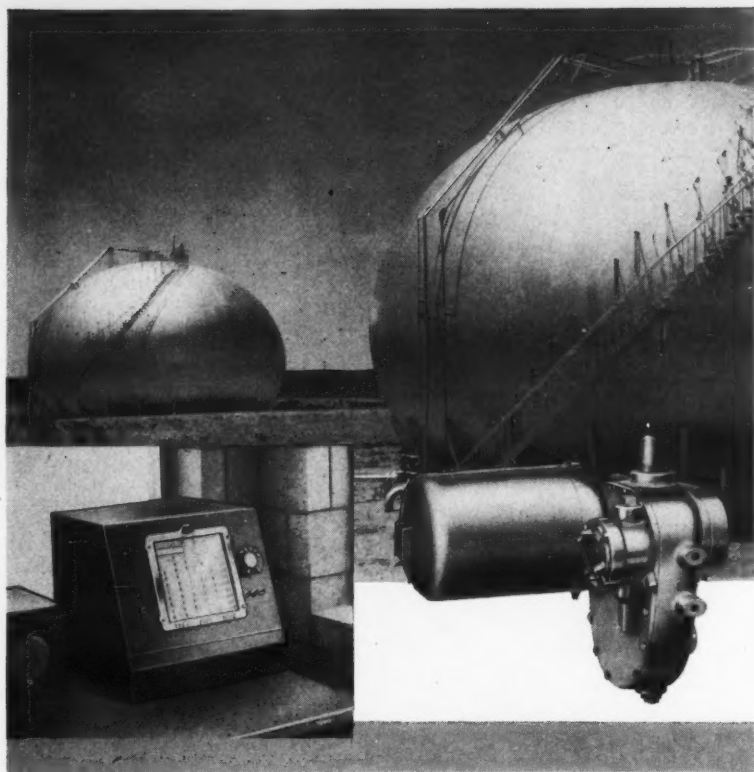


# ALLEN-BRADLEY

## SOLENOID MOTOR CONTROL

QUALITY

When inquiring check 1132 opposite last page



## "Varec" PULSE CODE KEEPS "TAB" ON OKAN PIPELINE

Keeping a pipeline flowing smoothly is a mighty big job . . . that's why OKAN PIPELINE wants the latest in automatic equipment to speed its work. An important part of this equipment is the "Varec" PULSE CODE Telemetering System, which signals the liquid level of storage tanks at terminals and along the line. In addition to this function, it turns valves on and off by remote control. "Varec" PULSE CODE operates over long distances, giving an accurate signal. It requires only a simple metallic pair for a communication link. It supplies a fast

reading in the record time of 5 seconds. There is also a unique feature for remote control of valves, pumps, etc., which confirms that the proper selection of remote function has been made and indicates the status of the selected function. The operator may now change the status and receive a confirmation that it has been completed.

You may want to cut your operating costs by using a "Varec" PULSE CODE System. Equipment for reporting either spot or average temperature, in addition to liquid level, is now available.

Write for "Varec" Bulletin CP-3011 for full details on  
"Varec" PULSE CODE Telemetering.

981-17

### THE VAPOR RECOVERY SYSTEMS COMPANY



Compton, California, U. S. A.

Cable Address: Varec Compton Calif (U.S.A.) All Codes

When inquiring check 1133 opposite last page

### INSTRUMENTATION

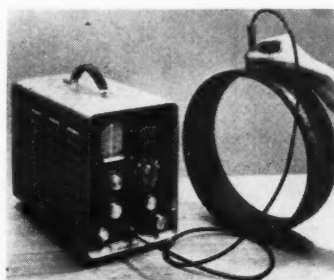
**Detects thin spots  
by ultrasonics —  
is portable . . .**

weight is only thirty pounds  
for complete instrument

**Uses:** Detecting thin spots in walls of cast, formed, welded, or ground objects; finding laminar defects and lack of bond between materials.

**Features:** Ultrasonic thickness tester is portable; weighs only thirty pounds complete.

**Description:** Ultrasonic tester operates by means of heavy duty



Checking wall thickness of sample pipe section with ultrasonic tester

electronic components which generate a continuously varying frequency. Energy output is fed to quartz crystal which emits ultrasonic vibrations. Cathode ray tube gives visual presentation of thickness. Accuracy is  $\pm 1\%$  of thickness.

Thicknesses beyond normal reading range (0.500") can be measured with special clipper circuit for accuracy in reading multiple harmonic pips. Harmonic calculator is included with instrument for measurements to four inches.

Calibration is in thousandths of an inch for type material being tested. Operation is on 115v AC, 60 cycle. Probe lead is five feet. Six scales cover ranges of thickness between 0.014" and 0.500".

(Type SO-100 Sonizon tester is product of Magnaflux Corporation, Dept. CP, 7300 West Lawrence Ave., Chicago 31, Ill. . . . or for more information check 1134 on convenient form opposite last page.)



**ACCURATE  
EASY READING  
MANOMETERS**

For precise reading as well as for accurate measurements choose Trimount Manometers.

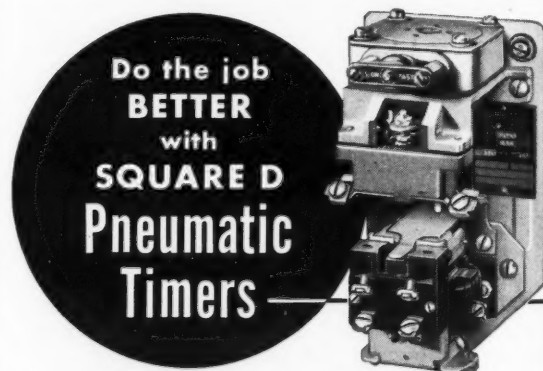
Sturdy construction—long lasting—used for many purposes—Multiple Tube, Well Type, U Tube, etc. Also custom made to your specifications.

Write for  
Illustrated Bulletin C

**Trimount**  
INSTRUMENT CO.

3119 WEST LAKE STREET • CHICAGO 12, ILLINOIS

When inquiring check 1135 opposite last page



**Do the job  
BETTER  
with  
SQUARE D  
Pneumatic  
Timers**

**Whether your requirements call for A.C. or D.C., these Square D design features deliver the most in consistent and accurate performance**

**Wide Range** • Time delay period easily adjusted over a period of 0.2 seconds to 3 minutes in an infinite number of steps.

**Easy Adjustment** • Finger tip adjustment of timing period can be made simply by rotating a knurled knob or a micrometer dial.

**Repeat Accuracy** • Less than 10% variation from the mean timing period. Accurate timing, even under abnormal ambient temperature conditions.

Write for Bulletin 225. Address Square D Company,  
4041 N. Richards St., Milwaukee 12, Wisconsin

NOW...EC&M PRODUCTS ARE A PART OF THE SQUARE D LINE



**SQUARE D COMPANY**

When inquiring check 1136 opposite last page

CHEMICAL PROCESSING



**Completes all-electric loop —**

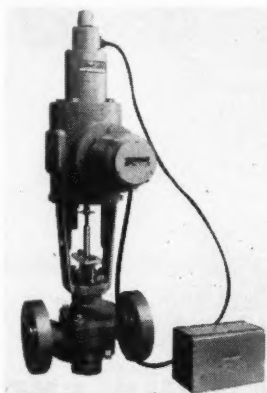
## Allows electrical actuation of final element

Intermediate operating fluids—pneumatic or hydraulic—eliminated in electric system

**Uses:** As positioning operator in conjunction with modern proportional-position electronic control systems. Can be used in applications where other methods of control may not be practical as: automatic control involving signal transmission over long distances, use in toxic atmospheres or under low ambient temperature conditions.

**Features:** Valve actuator is all-electric and eliminates use of intermediate operating fluids — pneumatic or hydraulic.

**Description:** Electric valve actuator uses force-balance control system. Input controller signal is applied to current-sensitive detector. Force is developed which produces a small motion in detecting element. Electrical output derived from unbalance is fed to relay amplifier. Direction of signal change is sensed and 110v AC is impressed on reversible low-inertia motor. Entire system is sensitive to  $\frac{1}{2}$  of 1% of controller signal span. Unit



Relay amplifier is in small case. Actuator is equipped with mounting yoke

has a repositioning accuracy of at least  $\frac{1}{2}$  of 1% of stem travel. Actuator has a rated output of 500 lb of thrust with a stem speed of 4 in./min. Stroke is  $\frac{1}{4}$  to 3".

Valve actuator is first in projected line of all-electric actuators planned by manufacturer.

(Series "D" All-Electric valve actuator is product of Conoflow Corporation, Sub. of Walworth Corp., Dept. CP, 2100 Arch Street, Philadelphia 3, Pa. Check 1137 opposite last page.)

Convenient chart gives kinetic viscosity of oils when absolute and specific gravity are known — see nomograph on page 210

# Simplest pneumatic controller to use and maintain

*Bristol gives you improved stability of control action —but keeps basic simplicity of Series 500 Controllers*

Bristol Series 500 Pneumatic Controllers are the easiest controllers on the market to use and maintain—still the most dependable and trouble-free.

The reason? The basic simplicity of the operating mechanism. That hasn't changed in the years since we introduced this long-time favorite among instrument men. Reason No. 2: they are equipped with famous Bristol measuring elements.

### Easy calibration

It's this foolproof simplicity of the control system that makes calibration so easy on Series 500 controllers. Only one service adjustment is required and provided to exactly calibrate the control system. The control system can be completely disassembled and after reassembly (even with replacement of parts) can be restored to precise cali-

bration with this one adjustment.

No special tools are required. A  $\frac{1}{4}$ -inch wrench is all that's needed.

The 500's completely interchangeable parts, accurately designed and manufactured to extremely close tolerances, make possible this built-in calibration.

### And check these features:

**Improved control stability**—advanced automatic control techniques have been applied by Bristol engineers to improve stability of control action in the new Series 500W Controllers.

**Wide-band models** offer choice of  $\frac{1}{2}$  to 400% proportional band with simple band shift.

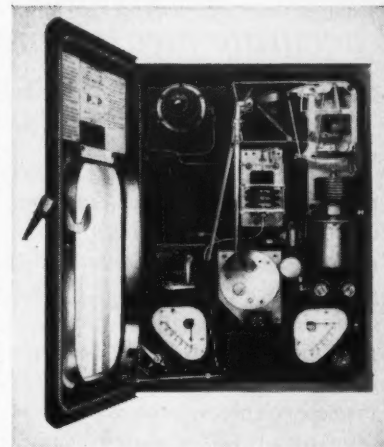
**True zero derivative setting**—exclusive with Bristol.

**Reset action stops** in reset models—again a Bristol exclusive—prevent loss of control due to prolonged deviation from set point.

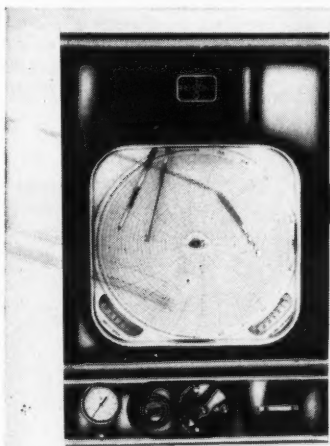
**Four-position internal transfer station** with automatic, manual, test, and service positions, plus pressure-matching button and manual pressure regulator, for maximum convenience in process control.

### Complete data available

Write today for engineering data on Bristol's Series 500 controllers for your critical control problems. They're available for automatic control of temperature, pressure, vacuum, draft, absolute pressure, liquid level, humidity, pH value, electrical measurements, and mechanical motion. The Bristol Company, 141 Bristol Road, Waterbury 20, Conn.



**FOUR-POSITION INTERNAL TRANSFER STATION** shown here in interior view of Series 500 Controller. Permits remote manual control, testing and servicing without disconnecting instrument.



**BRISTOL'S® SERIES 500 CONTROLLER**, shown here with four-position transfer station. Internal station also available.

### YOU CAN GET THESE CONTROL MODES:

1. Fixed narrow band (on-off)
2. Proportional band— $\frac{1}{2}$  to 100% and  $\frac{1}{2}$  to 30%.
3. Reset with wide band—rates 0.1 to 10 or 1 to 300 repeats per minute. Proportional band  $\frac{1}{2}$  to 400%.
4. Derivative (rate)— $\frac{1}{2}$  to 100% proportional band. Derivative time 0.2 to 20 min., plus zero derivative setting.
5. Reset plus derivative—proportional band and reset rate as in "reset" above. Derivative time as in "derivative" above.

### YOU CAN HANDLE THESE CONTROL PROBLEMS:

1. Cascaded control
2. Selective control
3. Ratio control
4. Time-program control
5. Pneumatic transmission.

6.55

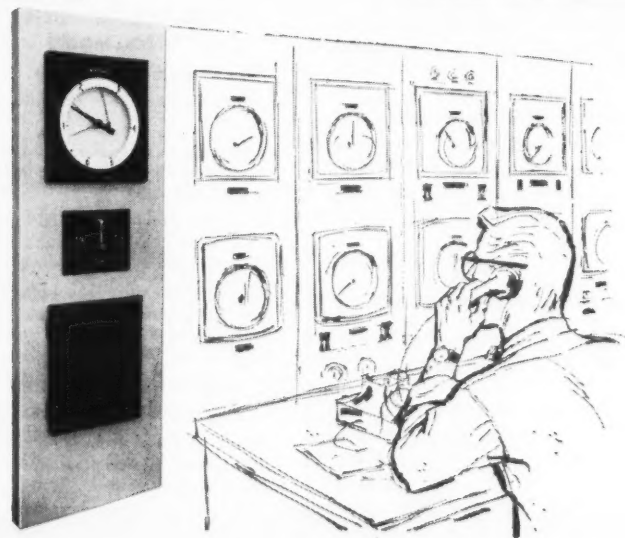
**BRISTOL** **TRAIL-BLAZERS**  
IN PROCESS AUTOMATION  
AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS.

When inquiring check 1138 opposite last page

# NEW

## Arnold O. Beckman Gas Density Balance ...for continuous, accurate measurement of process gas streams

Arnold O. Beckman, Inc., announces their new Gas Density Balance designed and constructed for rugged industrial use. This new instrument—known as the Model 3A—gives more sensitive, more versatile and more convenient readings than any gas density measuring unit now in use. The Model 3A is not only suited for specific gravity measurements of process streams, but also performs equally well for quantitative measurements of natural gas,  $H_2$ ,  $CO_2$  or other gases. The Model 3A is a null-balance type instrument which measures gas density by a direct physical principle, assuring rapid and accurate readings.



For more information on the Model 3A Density Balance write directly for Data File 22H-17

**Arnold O. Beckman INC.**  
1020 MISSION STREET • SOUTH PASADENA, CALIFORNIA

When inquiring check 1139 opposite last page

### HERE ARE A FEW OF ITS MANY OUTSTANDING FEATURES...

**Ranges:** Single or multiple ranges with spans from 0.05 to 5.0 sp. gr. relative to air.

**Rapid Response:** 95% of any reading in less than one minute.

**Sensitivity and Accuracy:**  $\pm 1/2\%$  of full scale.

**Corrosion Resistant:** Measuring element protected against corrosive elements.

**Output:** 0-5 millivolts standard for use with potentiometer type recorders. Current or pneumatic output available with instruments having single ranges, or two or more ranges having a common end point.

**Sample Required:** 48 cubic inches per minute at 10 psi.

**Power Required:** 130 watts with 115 volts, 60 cycles.

The Arnold O. Beckman Gas Density Balance is a single compact unit, designed for wall or flush mounting. The standard steel case is vapor tight, thermally insulated and controlled so that operation is unaffected by ambient temperature changes. The unit weighs about 65 lbs. Explosion-resistant cases are also available.

### INSTRUMENTATION

#### Combines all advantages of pneumatic control with AC operation...

measures and controls current to AC motors

**Uses:** As electro-pneumatic controller for measurement and control of current to AC motors or other AC circuits.

**Features:** All advantages of pneumatic control are combined with AC operation.

**Description:** Alternating current controller uses no vacuum tubes or transistors but uses a balanced beam and solenoid assembly. Cam-varied ratio of feedback force gives pneumatic output. Instrument can be used for either current measurement or for automatic control, including reset action. When

used for current measurement, pneumatic output is a 0.30 psi signal which can be either linear or non-linear with load. As a controller, set point can be adjusted manually or remotely. Reset time range adjustment is one to 60 seconds. Maximum secondary current for load limiting is 5.3 amps.

(AC Controller is product of Hagan Corporation, Dept. CP, 323 Fourth Ave., Pittsburgh 22, Pa. ... or for more information check 1140 opposite last page.)

#### Equations included in bul on diaphragm control valves

Specifications and tables giving principal dimensions, pressure and temperature ratings are included in bulletin on diaphragm control valve. Four-page bulletin also has series of equations for sizing.

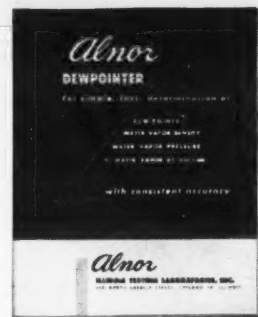
Bul 980 is issued by A.W. Cash Co., Dept. CP, PO Box 551, Decatur, Ill. Specify 1141 opposite last page.



### get this free INFORMATIVE BULLETIN

Learn how easy it is for anyone to determine dew points quickly and accurately with the

ALNOR DEWPOINTER!



Only the Alnor Dewpointer has a sealed testing chamber, where atmospheres can be analyzed under controlled conditions... where the fog is observed suspended in air for fast, positive readings. Completely self-contained and readily portable for laboratory accuracy anywhere in the plant or field. No cooling equipment required. And simple, direct operation enables even nontechnical personnel to easily obtain precise results, time after time.

Tear out this ad and send it along with your business letterhead to Illinois Testing Laboratories, Room 504, 420 N. LaSalle St., Chicago 10, Ill.



#### PRECISION INSTRUMENTS FOR EVERY INDUSTRY

When inquiring check 1142 opposite last page

## NEW!

# "250"

SERIES

## LIQUID EYE®

POSITIVE SEALING INDICATORS

designed to save you even more time and money

6 sizes now available: 3/8", 1/2", 3/4", 7/8", 1 1/8", and 1 3/8" O.D.S.

The new "250" has all the proved Liquid Eye advantages plus these newly engineered features:

- smaller—more compact, simplified design.
- preformed copper extension eliminates need for separate gaskets—foolproof installation.
- complete, self-contained, economy unit.

Ask your wholesaler now.

Write today for catalog covering the complete Allin line.

**Allin** ALLIN MANUFACTURING CO.  
410 N. Hermitage Ave. • Chicago 22, Illinois  
Over 1,000,000 Liquid Eyes Sold to Date!

When inquiring check 1143 opposite last page

CHEMICAL PROCESSING



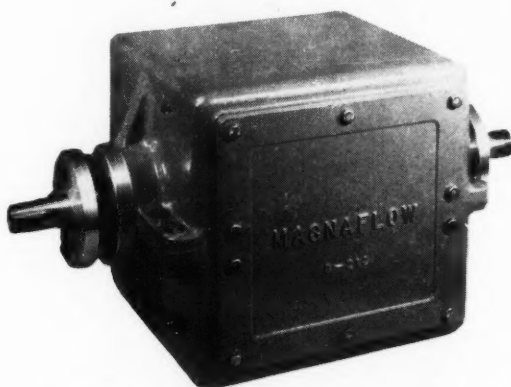
**Measures liquid flow velocity  
with no moving parts  
or pressure drop . . .**

for majority of liquids, induced electrical signal is independent of conductivity

**Uses:** As electromagnetic flow meter to measure flow rates as low as 100 cc/min and as high as 2000 gpm.

**Features:** Electromagnetic flow meter converts liquid velocity directly into electric potential without use of any moving parts or pressure drop.

**Description:** Flowmeter consists of measuring head or flow transducer containing a smooth-bore flow tube with platinum electrodes and exciter magnet plus electronic control unit. Instrument operates by inducing a voltage in moving fluid. For given tube diameter and constant magnetic field, transducer voltage directly proportional to



Measuring head of flow meter contains a smooth-bore flow tube with platinum electrodes. Induced voltage across moving fluid gives signal proportional to flow

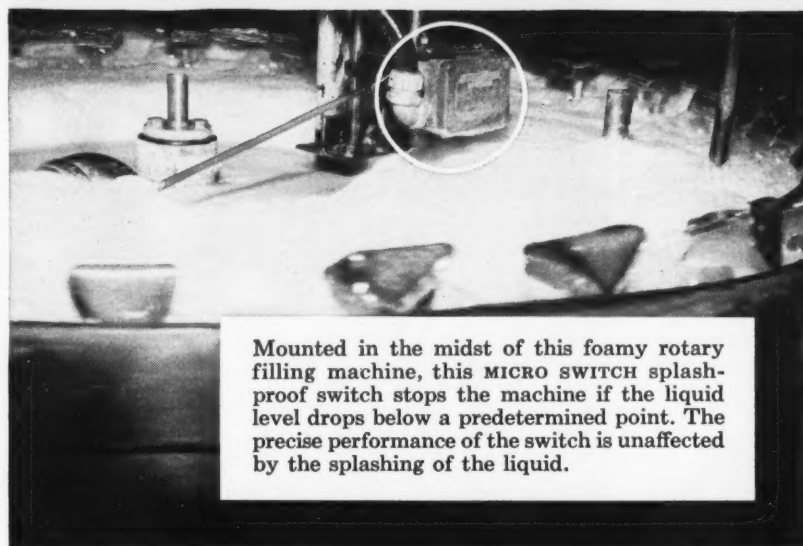
volumetric flow rate is generated. Signal is then coupled into a balanced amplifier. Output supplies energy for indicating, totalizing, recording, and controlling of flow rate.

Calibration of instrument is independent, for most liquids, of viscosity, density, temperature, and electrical conductivity. Linearity is approximately 0.1% over entire range.

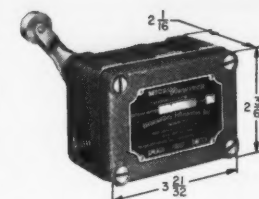
Instrument is manufactured in two models. One accommodates flow tube diameters from 3/16" to 1 1/4". Second is for diameters from 1 1/2" to 10". Standard units operate at pressures to 1000 psi and 350°F. Special units can operate at pressures to 2500 psi and 500°F. Flow rates can be from 100 cc/min to over 2000 gpm, depending on tube diameter. Standard connections are either threaded pipe or standard flange.

(Nucor Magnaflow is product of Nuclear Corporation of America, Inc., Dept. CP, Empire State Bldg., New York 1, N.Y. . . . or for more information check 1144 opposite last page.)

# MICRO SWITCH . . . FIRST IN PRECISION SWITCHING



Mounted in the midst of this foamy rotary filling machine, this MICRO SWITCH splash-proof switch stops the machine if the liquid level drops below a predetermined point. The precise performance of the switch is unaffected by the splashing of the liquid.

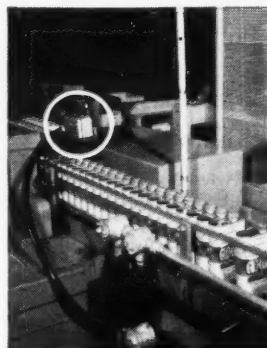
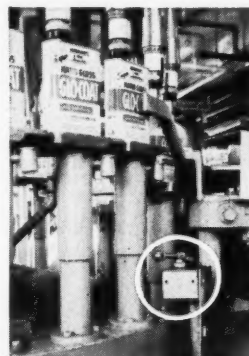


MICRO SWITCH Splash-Proof Switches are constructed to resist the splash of liquids. A seal on the actuating shaft and a gasket on the cover gives a good seal against normal splash conditions. A heavy aluminum housing protects the enclosed switch. These switches combine long electrical life with accurate repeatability. They are available with adjustable roller-arm actuators (shown) or with push-rod plunger actuators. Can be supplied with a variety of electrical ratings and contact arrangements.

## Splashed all day with liquid wax . . .

### MICRO SWITCH Precision Switch performance is unaffected

MICRO SWITCH precision switch is used to prevent "jam up" on a rotary can-filling machine. If the platform sticks and does not lower to the level of the conveyor, the switch stops the conveyor until trouble is corrected.



Switch at the left is held operated by the nozzles of the cans. Should a can be upset, or reversed, the switch actuator releases, opens the circuit and the conveyor stops. Another switch keeps track of the supply of knock-down shipping cases, in a similar manner. It stops the conveyor if the supply is low.

MICRO SWITCH offers a complete line of splash-proof and explosion-proof switches to meet requirements of food and chemical processing plants. Thousands of plant superintendents, electricians, maintenance men have made their equipment more automatic, more productive and safer with the use of these precision switches.

Johnson's Wax Company engineers chose splash-proof MICRO SWITCH precision switches to control packing equipment in their modern Racine plant. From controlling the level of the rotary filling machine, through every packaging step, MICRO SWITCH units insure safe, efficient operation as over 200 cans are filled in each line per minute.

See the MICRO SWITCH distributor near you. Look under "Switches, Electric" in the Yellow Pages.

See MICRO SWITCH Catalog No. 83  
for complete information  
on the wide line of  
heavy-duty precision switches  
for industrial use. Wire today.



## MICRO SWITCH

A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

In Canada, Leaside, Toronto 17, Ontario • FREEPORT, ILLINOIS



When inquiring check 1145 opposite last page

**Has interchangeable scales  
to test and calibrate  
thermocouples . . .**

has a set of nine scales — six for temperatures and three for millivolts

**Uses:** As portable potentiometer pyrometer for checking and calibrating industrial, or laboratory temperature instruments.

**Features:** Pyrometer has nine interchangeable, direct-reading scales — six for temperatures and three for millivolts.

**Description:** Portable potentiometer pyrometer can be used for checking and calibrating any temperature recorder, indicator, or controller operat-



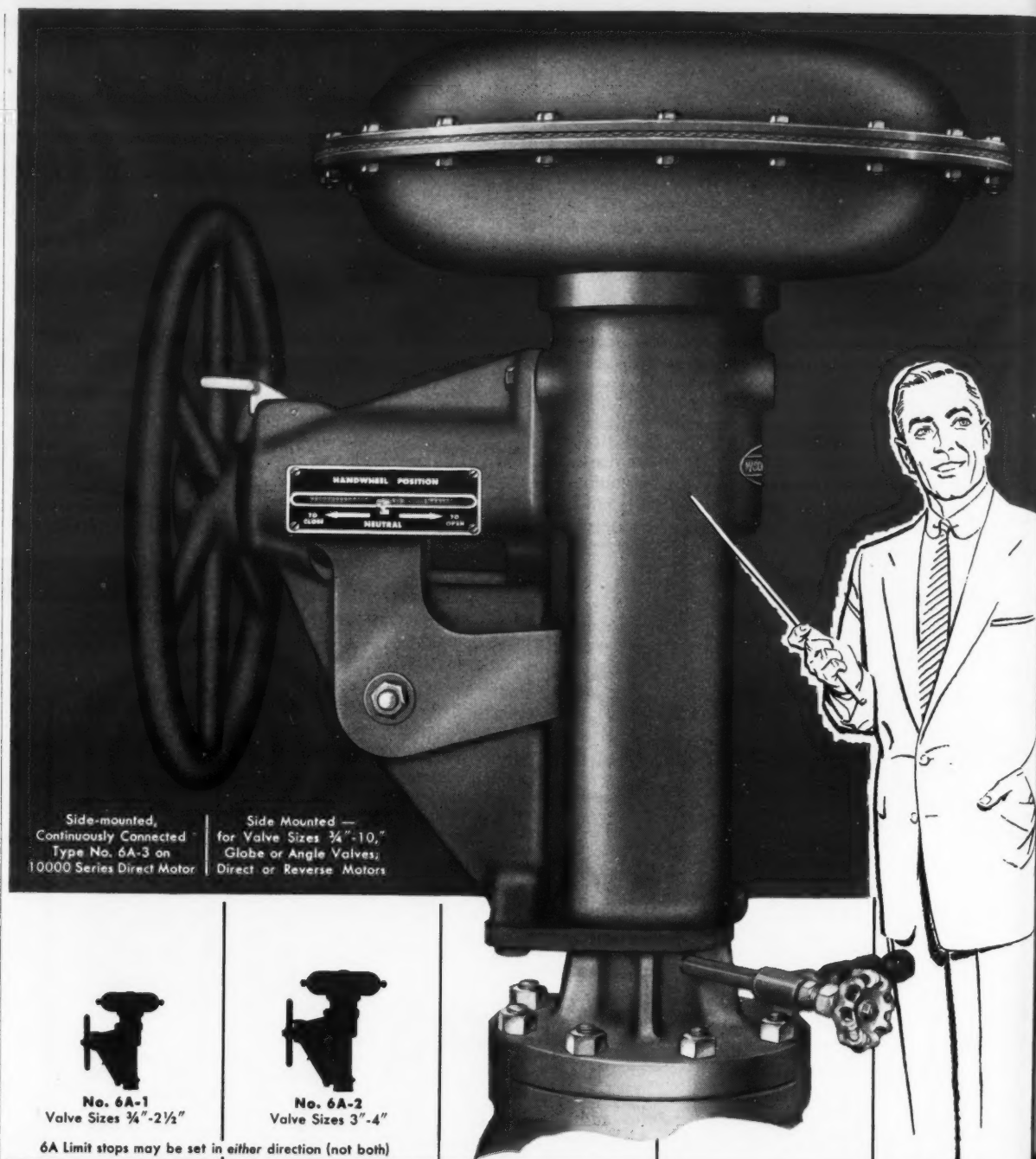
Direct-reading scales of pyrometer interchangeable for reading in temperature or millivolts

ing within range of 32° to 3215°F, and using any thermocouple. Instrument can also be used for measuring DC potentials of electrical equipment within a range of zero to 155 millivolts. Scales are interchangeable in 30 seconds. Temperatures or millivolts are read directly. Charts, graphs, or conversion tables are not required.

Instrument has accuracy of 1/6 of 1% of scale spans. Slidewire resolution exceeds 4000 increments. Effective open scale length is 50 1/2". Each scale is photoetched aluminum disc. Temperature scales can be either Fahrenheit or Centigrade readings.

Instrument is self-contained with built-in power supply. Unit is enclosed in maple case, with removable cover and leather handle. Weight is 14 lb. Overall dimensions are 12 1/4 x 9 x 8 1/2".

(Pyrotest 9B is product of Technique Associates, Inc., Dept. CP, 211 East South Street, Indianapolis 25, Ind. . . or for more information check 1146 on convenient Reader Service slip which is located opposite last page.)



Side-mounted,  
Continuously Connected  
Type No. 6A-3 on  
10000 Series Direct Motor

Side Mounted —  
for Valve Sizes 3/4"-10,"  
Globe or Angle Valves;  
Direct or Reverse Motors



**No. 6A-1**  
Valve Sizes 3/4"-2 1/2"



**No. 6A-2**  
Valve Sizes 3"-4"

6A Limit stops may be set in either direction (not both)



**No. 2-9**  
Valve Sizes 1/2"-1 1/2"  
Direct Motor



**No. 2-11**  
Valve Sizes 2"-2 1/2"  
Direct Motor



**No. 2-13**  
Valve Sizes 3"-4"  
Direct Motor



**No. 3-15**  
Valve Size 6"  
Direct Motor



**No. 3-18**  
Valve Sizes 8"-10"  
Direct Motor

Case Mounted — for Valve Sizes 1/2"-16", All Valve Types • Limit stops may be set in one direction only (upward travel)



# Masoneilan Handwheels Available in 17 Models for Extra Safety

**For Emergency Manual Operation . . . For  
Travel Limit Stops on Air Operated Control Valves**

Handwheels provide vital safeguards wherever air failure might be costly in loss of process media or dangerous to plant and personnel. In these cases, provision for manual operation of the control valve is inexpensive insurance.

Mason-Neilan offers the widest available selection of handwheel equipped control valves to provide this extra measure of safety for such applications as . . .

- Liquid or gas pipe lines
- Feed lines to process heaters
- Main process backpressure service, such as poly plant reactor outlets
- Critical liquid level control installations, especially ammonia let-down

In addition, these handwheel units are equally useful in providing travel limit stops to insure . . .

- Limiting minimum flow on gas fired units
- Limiting maximum flow on liquid level applications and similar installations

The Masoneilan Handwheel is sturdily constructed and matched to the individual control valve to do the job for which it is designed, with a minimum of effort. For further information consult the office nearest you — or write . . .

## MASON-NEILAN

Division of Worthington Corporation  
25 NAHATAN STREET, NORWOOD, MASSACHUSETTS



Sales Offices or Distributors in the Following Cities: New York • Syracuse  
Chicago • St. Louis • Tulsa • Philadelphia • Houston • Pittsburgh  
Atlanta • Cleveland • Cincinnati • Kansas City • Phoenix • Detroit  
San Francisco • Louisville • Salt Lake City • El Paso • Albuquerque  
Charlotte • Los Angeles • Corpus Christi • Denver • Appleton  
Birmingham • New Orleans • Seattle  
Mason-Neilan Regulator Co., Ltd., Montreal and Toronto

### Permits temperature control of two circuits

**Uses:** For electrical control of two independent circuits according to temperature. Unit permits flexible switching arrangements and switch action above and below set point.

**Features:** Local mounted temperature controller can substitute for two separate single switch controls. Units have external range adjustment.

**Description:** Temperature control is dual switch unit activated by immersion element. Temperature variations in medium to be controlled are converted into a force that causes bellows plunger to operate two switches. Control head is enclosed by cast aluminum case with black wrinkle finish. Unit has calibrated scale for range adjustment. Spans of 50° to 100°F between limits of 30° and 400°F are available.



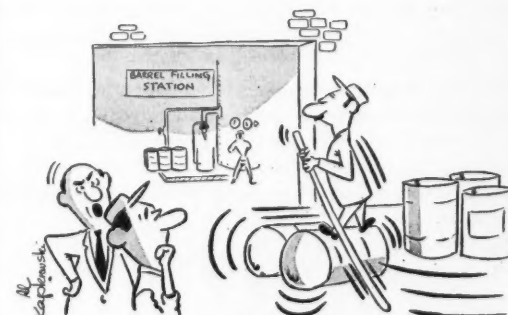
Temperature control operates two switches

Unit weighs approximately 15 ounces. Mounting can be in any position, using 1/2" NPT on immersion element. Lead wires enter unit through clearance hole in enclosure and are attached to internally-located terminal block. Combinations of NO, NC, or double-throw switches can be supplied.

(Type B27A temperature control is product of United Electric Controls Company, Dept. CP, 79 School St., Watertown, Mass. . . or for more information check 1148 on form opposite last page.)

<p><b>No. 6A-3</b> Valve Sizes 6"-10" 6A Limit stops may be set in either direction (not both)</p>	<p><b>No. 9-9</b> Valve Sizes 1/2"-1 1/2" Reverse Motor</p>	<p><b>No. 9-11</b> Valve Sizes 2"-2 1/2" Reverse Motor</p>	<p><b>No. 9-13</b> Valves Sizes 3"-4" Reverse Motor</p>	<p>Continuously Connected Gear Operated Type for Valve Sizes 12"-16", Globe or Angle Valves; Direct or Reverse Motors <b>No. 8-18, 8-24</b></p> <p>Limit stops may be set in both directions.</p>
<p>Limit stops may be set in either direction (not both)</p>				
<p><b>No. 3-18</b> Valve Sizes 8"-10" Direct Motor</p>	<p><b>No. 4-18</b> Valve Sizes 8"-10" Direct Motor</p>	<p><b>No. 5-18</b> Valve Sizes 12"-16" Direct Motor</p>	<p><b>No. 6-18</b> Valve Sizes 12"-16" Direct Motor</p>	<p><b>No. 7-24</b> Valve Sizes 12"-16" Direct Motor</p>
<p>Case Mounted — for Valve Sizes 1/2"-16", All Valve Types • Limit stops may be set in one direction only (upward travel)</p>				

When inquiring check 1147 opposite last page



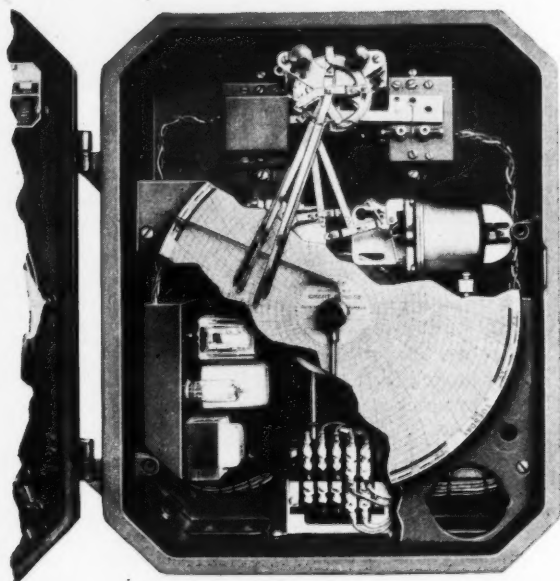
"I don't care where he worked before . . ."

Another cartoon by Al Kapkowski, Bayway Refinery of Esso Standard, Linden, N.J.

# NEW

## ELECTRONIC CONTACT CONTROLLER

BY Taylor



### FEATURES

- Changing Resistor-Capacitor Can gives Single Point or Differential Control. Control point easily adjusted by set pointer.
- Fully adjustable, self-locking differential between high and low contacts. Safe contact voltage—never over 6 volts. Current in micro-amps.
- Self-wiping control contacts made of non-corrosive Monel. All other parts are hermetically sealed against corrosion.
- Electronic tube, Relay and R-C Can are plug-in units. Load Contacts on Relay are Single-pole double-throw.
- Attachments can be fitted to present 100 Series Taylor Instruments with no drilling.
- Internal wires and external connections numbered for easy servicing. Signal lights and vibration damping available.

HERE'S rugged, positive contact action for control mechanisms of the two-position action type—the "on-offs", "open-shuts" and "high-lows". This new Taylor Electronic Contact Controller embodies a completely new concept in contact mechanisms—it's designed for:

1. Accurate and dependable operation of electrical circuits.
2. On-off applications with small process lags, slow reaction rates, and small and infrequent load changes.
3. Use on nearly all types of measuring systems—temperature, pressure, liquid level, flow, humidity, speed, etc.
4. Indicating, recording and/or controlling purposes. An extremely versatile instrument, the new Taylor Electronic Contact Controller can be used in many different places where pneumatic facilities aren't advisable or available. It's made also for use as a supplement to pneumatic control.

These standard forms emphasize the flexibility of the instrument: Two-Position Single Point Action (On-Off), Two Position Differential-Gap Action (On-Off with adjustable differential gap or neutral zone), and Three-Position Differential Gap Action (High-Medium-Low, differential adjustable).

For full details ask your Taylor Field Engineer or write for **Bulletin 98265**. Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

*Taylor Instruments*

— MEAN —

**ACCURACY FIRST**

IN HOME AND INDUSTRY

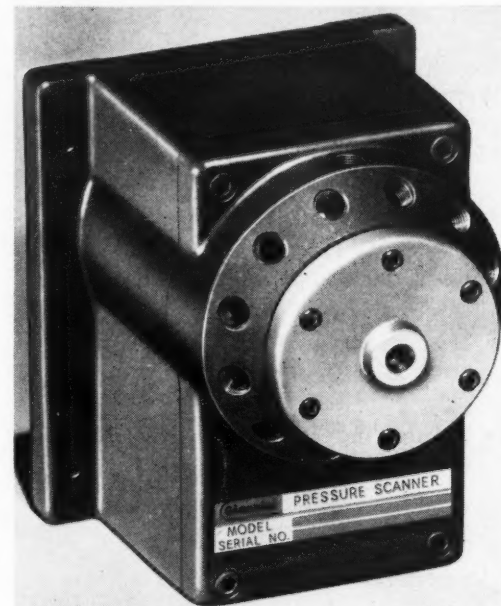
### INSTRUMENTATION & CONTROL

**Reduces number of transducers needed to measure pressure from multiple sources . . .**

has low internal volume so as not to affect pneumatic response of conventional systems

**Uses:** As pressure scanner for measurement of up to twelve pressure sources with only one transducer. Instrument can also be used to introduce calibration or zero pressures during each scan cycle for calculation of transducer response.

**Features:** Pressure scanner is designed with low internal volume so as not to affect pneumatic re-



Pressure scanner is designed to allow measurement of up to 12 pressure sources with one transducer

sponse of conventional pressure systems. Points may be skipped or scanned in desired sequence by remote control.

**Description:** Scanner consists of stator having twelve input ports and rotor which connects input ports with an output port. Rotor is rotated to desired position by an unidirectional high-torque motor. Positive positioning arrangement controls operation of motor. Relay circuit incorporated into unit provides dynamic braking to stop motor with rotor and stator ports in coincidence. Additional bank of contacts is provided on internal switch. Indication of rotor position can thus be obtained either visually (lights) or digitally for operation of recording devices.

Pressure unit will operate over range from 0.1 psia to over 350 psia and can be used for dry air and non-corrosive dry gases. Unit can be installed to interrogate 12 other pressure scanners, permit-

When inquiring check 1149 opposite last page

CHEMICAL PROCESSING



ting measurement of 144 pressures with only one transducer. Other systems can be arranged for selection of transducer with proper range in system where high accuracy is required over wide range of pressures.

(SP-101 Pressure Scanner is product of Datex Division, G. M. Giannini & Co., Inc., Dept. CP, 1307 South Myrtle Avenue, Monrovia, California. Check 1150 opposite last page.)

**High heads taken in stride —  
transmitter produces linear  
signal for 1200" WC . . .**

output is 3-15 or 3-27 psi for differentials from 100 to 1200 inches of water

**Uses:** As flow rate transmitters for steam, water, other liquids and gases at maximum differentials from 100 to 1200" WC.

**Features:** Transmitter extracts square root from differential pressure and transmits a pneumatic signal which is directly proportional to flow rate.

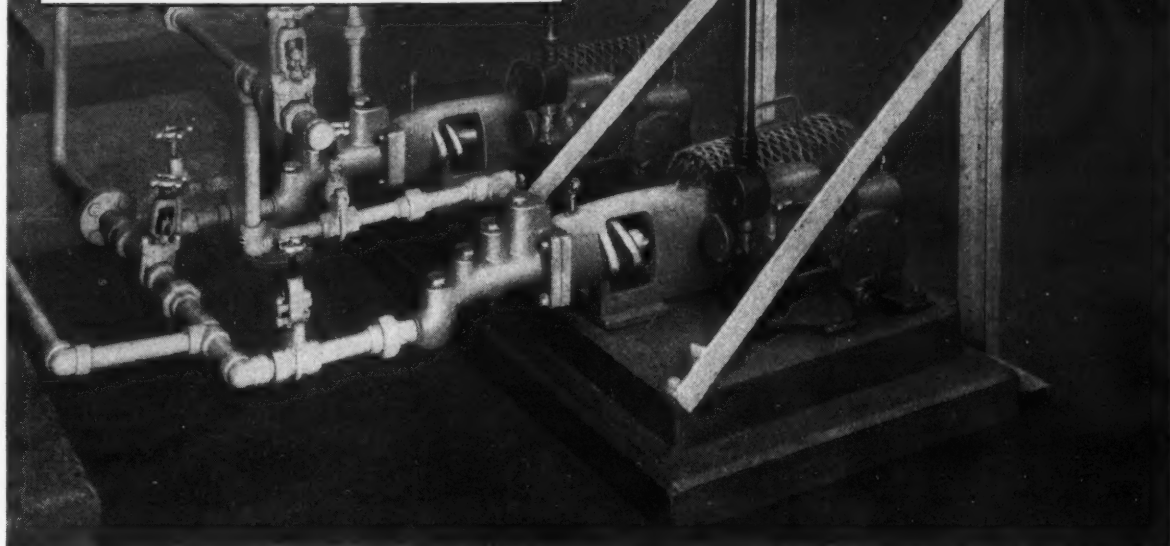
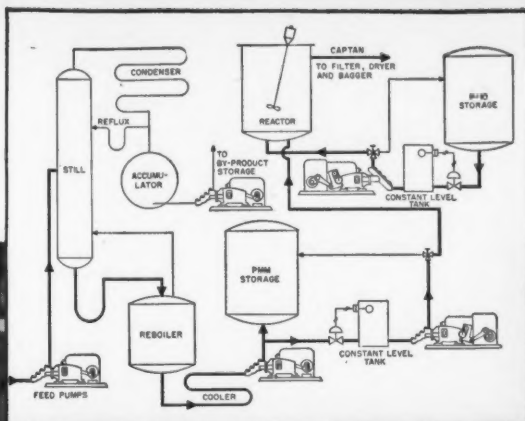
**Description:** Transmitter employs enclosed mercury U-tube manometer (though a mercury-less



Flow indication of 0-100% is shown at transmitter

unit is available for specific applications). Indicating transmitter mounts next to this manometer. Output signals of 3-15 or 3-27 psig are directly proportional to flow rate. Transmitter indicating scale shows 0 to 100 percent of maximum flow.

("High-head" flow transmitters are products of Bailey Meter Co., Dept. CP, 1050 Ivanhoe Rd., Cleveland 10, Ohio. Check 1151 opposite last page.)



*In the production of Captan, an agricultural fungicide, Milton Roy pumps control feed rates in the separation of perchloromethylmercaptan by distillation at Calhio Chemicals, Inc., Perry, Ohio. The accurate delivery of these pumps also permits reacting of chemicals in stoichiometric amounts.*

## Controlled Volume Pumps hold critical material balances

### Provide precise control of distillation columns

You can step up the efficiency of complex distillation processes with Milton Roy Controlled Volume Pumps. These pumps make possible extremely close control of chemical feed rates and rates at which distillates are withdrawn from the still. With precise control of feed and distillate rates comes the fine balance of chemical materials which is essential to ultimate product quality.

Accurate in delivery within  $\pm 1\%$ , Milton Roy Controlled Volume Pumps serve equally well as flow controllers, ratio controllers, or final control elements. They're available in simplex, duplex, and multiple liquid end types. Capacities from 3 milliliters per hour to 45 gpm. Pressures to 50,000 psi.

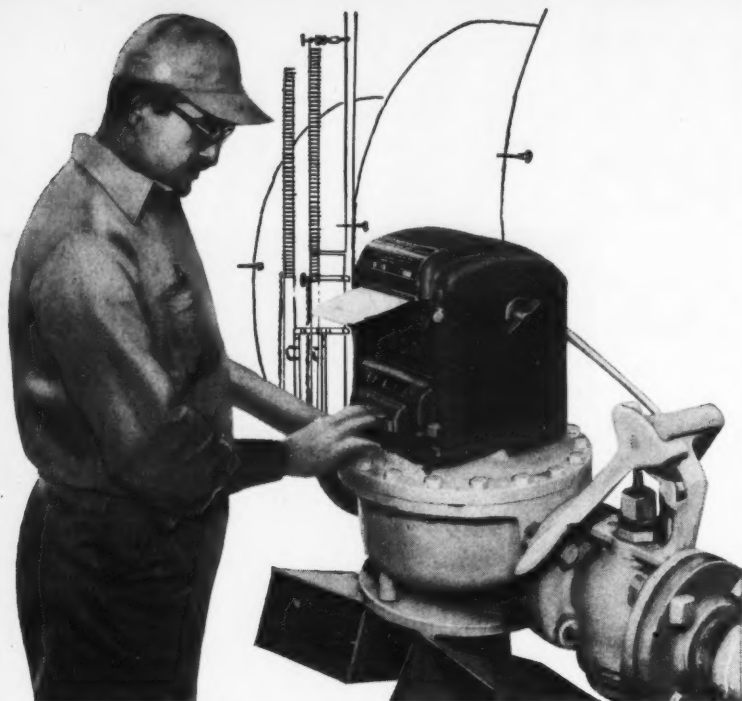
Why not investigate these pumps for chemical metering in your own plant? Upgraded product quality, reduced chemical costs, savings in operating and maintenance expense are certain results. Milton Roy Company, Manufacturing Engineers, 1300 East Mermaid Lane, Philadelphia 18, Pa.

Write today for application data on Controlled Volume Pumps in Process Instrumentation (Bulletin 1253).



Engineering representatives in the  
United States, Canada, Mexico,  
Europe, Asia, South America and Africa.

When inquiring check 1152 opposite last page



## New quality control- Meter-Printed Batch Tickets with

### NEPTUNE *Liquid* METERS

Get printed proof of delivery and automatic control of liquids going into the batch... with the Neptune Print-O-Meter. Prints exact quantities, with serial numbers and code letters to identify the batch and/or station. Foolproof operation... ticket is inserted and locked in place in meter before delivery. Ticket cannot be removed before being printed out.

You get quality control and dispute-free printed records of delivery if you handle any of these liquids (and others too!). Print-O-Meter sizes: 1 to 4 in., capacities 5 to 500 gpm. Other meters 2 to 1000 gpm.

Send for free Technical Metering Bulletin 567-H P.



**NEPTUNE METER COMPANY**  
19 West 50th Street, New York 20, N. Y.

Branches in

ATLANTA • BOSTON • CHICAGO • DALLAS • DENVER  
LOS ANGELES • LOUISVILLE • NO. KANSAS CITY, MO.  
PHILADELPHIA • PORTLAND, ORE. • SAN FRANCISCO (Millbrae)  
In Canada: TORONTO 14, ONT.

#### How many of these liquids can you handle better with Neptune?

Acetates	Lime Water
Acetone	Linseed Oil
Alcohol	Liquid Soap
Ammonium Nitrate	Liquid Sugar
Banana Oil	Lubricating Oil
Barium Chloride	Methylated Spirits
Benzol	Methyl Bromide
Borax Solution	Methyl Formate
Brine	Methylene Chloride
Bunker "C"	Mineral Spirits
Butanol	Naphtha
Calcium Chloride	Oleic Acid
Carbon Bisulphide	Sodium Benzoate
Carbon Tetrachloride	Sodium Carbonate
Castor Oil	Sodium Chloride
Cellulose Solvent	Sodium Silicate
China Wood Oil	Soy Bean Oil
Chloropirrin	Starch Solution
Chocolate	Stearic Acid
Cocoa Butter	Styrene Monomer
Coccol Oil	Sugar Syrups
Coffee	Tallow
Condensate	Tannic Acid
Corn Syrup	Trichlorethylene
Cotton Seed Oil	Tungwood Oil
DDT	Turpentine
Dextrose Solution	Varnish
Diacetone	Vinyl Lacquer
Diethyl Phthalate	Water
Diethyl Carbitol	Wax Emulsions
Diethylene Glycol	Whiskey
Dimethyl Phthalate	Wine
Ethyl Cellosolve	Xyol
Ethylene Glycol	
Fish Oil	
Formaldehyde	
Freon	
Fuel Oil, Hot	
Glucose	
Glue, Water Sol.	
Glycerine	
Grease	
Ink	
Isobutylene	
Isopropanol	
Kerosene	
Lacquer	

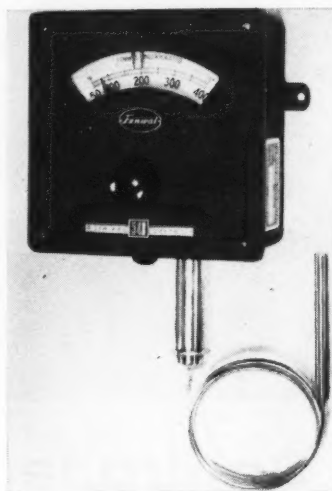
## INSTRUMENTATION

### Build temp controller to any specs...

basic unit features interchangeable parts, variety of functions

**Uses:** Interchangeable parts and flexible design permit a wide variety of control actions. Ranges for temperature control are  $-150$  to  $700^{\circ}\text{F}$ ;  $-100$  to  $100$ ,  $0$  to  $200$ , to  $200$ ,  $50$  to  $400$ , and  $50$  to  $25$  to  $375^{\circ}\text{C}$ .

**Features:** Series of temperature controllers offers a choice of four control mechanisms involving one or two circuits, and four types of

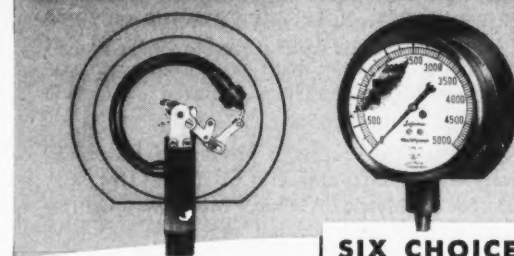


One- and two-circuit controllers have standardized design

control switches. A variety of filled bulbs and capillaries are designed for use with other components.

**Description:** Four control mechanisms include: 1) control switch with temperature-setting pointer, 2) two control switches with temperature-setting pointer for one of these (second switch can be set to operate at selected temperature difference above or below first, both switches reset simultaneously), 3) two switches as in second arrangement, but with temperature-setting pointer for each, and 4) two control switches with temperature-setting pointer for each and independent reset. Operating temperature difference between two

# STAINLESS!



### —from inlet to tip

Now the superlative Mastergauge is available in a wider range of corrosion resistant tubes and sockets than any other pressure gauge.

Check the adjoining list. And remember that tube socket and tip are fused into one piece by the exclusive Marsh "Conoweld" process.

Marsh alone combines the "Conoweld" construction, the copper-clad "Marshallloy" case, the finer Mastergauge movement, the Marsh "Recalibrator", the new "Safecase." Ask for data covering your specific needs.

MARSH INSTRUMENT CO., Sales affiliate of Jas. P. Marsh Corp. Dept. Z, Skokie, Ill.  
Marsh Instrument & Valve Co., (Can.) Ltd. • 8407 103rd St., Edmonton, Alberta, Can.

## MARSH



When inquiring check 1154 opposite last page

### SIX CHOICES of tubes and sockets

**4130 alloy steel tube** with alloy steel tip and socket.

**403 stainless steel tube** with alloy steel tip and socket.

**403 stainless steel tube** with 416 stainless tip and socket.

**316 stainless steel tube** with alloy steel tip and socket.

**316 stainless steel tube** with 303 stainless tip and socket.

**"K" Monel tube** with alloy steel tip and socket.



## alphabetical index on page 217

... for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 217. "Quick-locator" starting on that page was a feature in **CHEMICAL PROCESSING** years ago. It means extra work for the Editors, but it helps you, the reader, in finding what you want ... in a hurry!



## INSTRUMENTATION

switches can be adjusted for a maximum of about  $\frac{1}{2}$  full scale to a minimum of about  $1^\circ\text{F}$ .

In electrical ratings, any of the switches above can be of four types. Standard differential switch is rated for a  $\pm 1^\circ\text{F}$  span. Narrow differential switch is rated at  $0.5^\circ\text{F}$ . In addition there are "high inrush" and manual reset switches.

Bulbs with  $\frac{1}{8}$ -,  $\frac{1}{4}$ - and  $\frac{3}{8}$ -inch diameters are available with six or ten foot capillaries. All bulbs are stainless steel. Capillary may be stainless or nickel-plated copper.

In addition to variations possible with basic system components, cases are available in a variety of finishes — though all controller housings are dust proof and splash proof. Controller cases are compensated for ambient temperatures between 50 and  $150^\circ\text{F}$ .

(Series 541 temperature controllers are products of Fenwal Incorporated, Dept. CP, Ashland, Mass. Check 1155 opposite last page.)

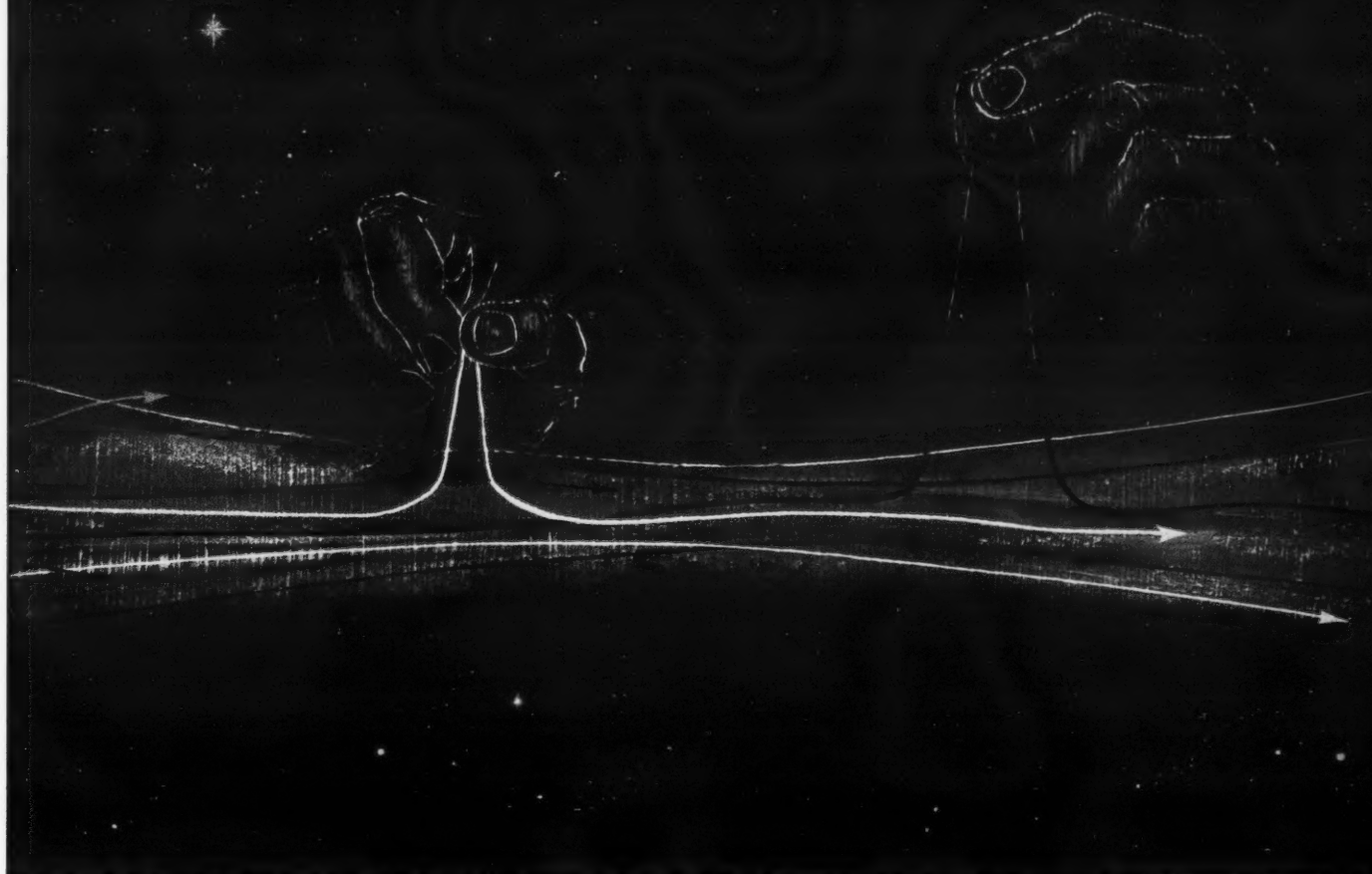


**Time delay relay**

... of miniature size has electronic timing circuit with no moving parts. Constant delay periods, from 0.1 sec to 5.0 sec, are available. Timing control is accurate to 10% of nominal from  $-55^\circ$  to  $125^\circ\text{C}$  with input voltage variations of 10%. Relay is DPDT, rated 2 amp.

(Time delay relay is product of Tempo Instrument Co., Dept. CP, 5 Centre St., Hempstead, N. Y. Check 1156.)

For more information on product at right, specify 1157 ... see information request blank opposite last page.



*the analytical technique of tomorrow...*

## CONTINUOUS GAS CHROMATOGRAPHY

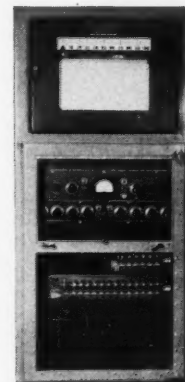
*ready for your process stream today!*

In the past twenty years, no single achievement has been more significant to the field of Process Control than the perfection of the technique of CONTINUOUS GAS CHROMATOGRAPHY. This remarkable new method brings a new level of reliability to plant stream analysis — and with it, simplicity unequalled by any other analytical technique. Many authorities have predicted it will bring about a revolution in continuous process control — through improved product quality, and increased yields.

Now, as a result of the advanced development work of a leading chemical company ... precision engineering by Watts Manufacturing Company, Roncerverte, W. Va. ... and application engineering skill and national sales and service by Beckman Instruments, Inc. — a fully-engineered, thoroughly tested CONTINUOUS GAS CHROMATOGRAPH is available for delivery to your plant — months ahead of the most optimistic schedules.

To obtain full information about this important new instrument, write Beckman Instruments, Inc., Process Instruments Department, Fullerton, California. Ask for Data File N-29-11.

**Beckman** / process instruments





*...may be answered*

by one of more than  
**50,000 standard USG gauges**

Eliminating the expense of special gauge design and manufacture is an important factor in reducing production costs. To keep costs low on "special" gauge designs, USG is tooled for more than 50,000 different standard gauges. Many of these are of unique design and application. It is possible that with slight modification one or more of them will exactly meet your design requirements and save you important time and costs.

The U. S. Gauge background of over 50 years of gauge design and manufacture assures you the experience and resources that make possible an easy solution to special gauge applications.

Why not call the nearest USG Distributor or write the factory direct to determine whether we can supply a standard to your specifications, a modified standard, or whether or not your problem will actually require a completely new and special USG design. The call might save you hours in production time and a significant savings in cost.

**USG**  
**UNITED STATES GAUGE**

Home of the **SUPERGAUGE**

Division of American Machine and Metals, Inc.  
Sellersville, Pa.

When inquiring check 1158 opposite last page

## INSTRUMENTATION

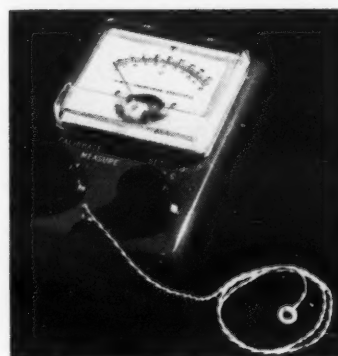
**Measures "hot spots"  
and surface heat . . .**

power transistor thermometer  
covers range from 35 to 85°C

**Uses:** Measuring surface temperatures and "hot spots" within range of 35 to 85°C.

**Features:** Thermometer is battery-powered transistor instrument. Sensing elements are designed to be fastened to surface being measured by screw.

**Description:** Sensing elements are for #4, 6, 8, and 10 screw sizes and 1/4" hole diameter. Outside diameter of elements is from



Sensing elements are fastened to surface being measured by screw

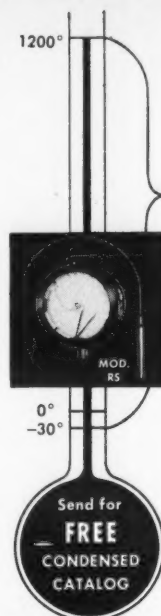
9/32" to 7/16". Instrument is calibrated in both Centigrade and Fahrenheit over 50°C range. Battery life is approximately 250 hours. Unit weighs 13/8 lb and measures 4 x 6 x 25/8".

(Model 1 Thermometer is product of B & B Engineering Associates, Dept. CP, Beech Hill, RFD 1, Concord, N. H. . . . or check 1159 opp. last page.)

**Catalogs control valves  
for special problems**

Eight-page condensed catalog lists automatic pressure, temperature, and level control valves for special control problems.

Bul 56C is issued by Atlas Valve Company, Dept. CP, 280 South St., Newark 5, New Jersey. Specify 1160 opposite last page.



**Specify partlow  
for positive, accurate  
Temperature Control . . .  
in the  
-30°F. to 1200°F. range**

Partlow Controls are fine precision instruments, but they're not temperamental. Action is positive and powerful. And they're built to last. Twenty-year records are not unusual.

There's a Partlow Control to fit your requirements. For use with gas, oil, steam or water valves; or electrical equipment.

Send for  
**FREE  
CONDENSED  
CATALOG**

Contains illustrations, brief descriptions, prices of Partlow Controls. Models listed cover temperature range from -30°F. to 1200°F., for industrial heating or refrigeration.



**partlow**

the pioneer in mercury thermal controls

THE PARTLOW CORP., Dept. P-157, NEW HARTFORD, N. Y.  
Offices in All Principal Cities

When inquiring check 1161 opposite last page



The DENSITROL is an extremely accurate, sensitive instrument for continuously, accurately and automatically controlling or recording the blending, mixing, separation, dilution or concentration of industrial process liquids. It quickly pays for itself because it eliminates operator attendance and does on a continuous basis what formerly was done on a batch basis.

For ranges, calibrations and other specifications, write, wire or call.

**PRECISION THERMOMETER & INSTRUMENT CO.**  
1434 BRANDYWINE STREET • DEPT. CP • PHILA. 30, PA. • RI 6-6671

When inquiring check 1162 opposite last page

CHEMICAL PROCESSING



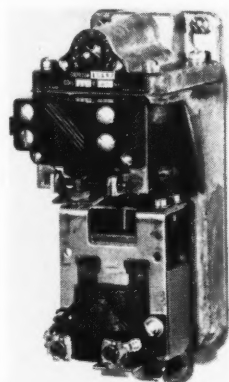
**Gives adjustable time delay  
using pneumatic bleed  
through orifice . . .**

designed for heavy duty applications; will interrupt alternating currents to 25 amp

**Uses:** As time delay relay to introduce an interval between operation of an electrical contact and actual operation of controlled unit, as conveyor lines, process operations.

**Features:** Time delay relay gives an adjustable time delay from 1/5 to 180 seconds and will interrupt alternating current to 25 amperes.

**Description:** Relay consists of operating solenoid, pneumatic head, and snap action timing contacts. Pneumatic head contains a diaphragm and adjustable orifice which act as timing medium.



Time delay relay has adjustable delay to three minutes

Time delay can occur either before or after energizing or de-energizing solenoid coil. Unit is designed to be converted from one form to another in field. Operating cycle with time delay after energizing coil: solenoid is energized and plunger moves away from timing stem; spring causes diaphragm to enlarge a chamber and allow air to

enter at a controlled rate through an adjustable orifice. Time delay contacts are operated as stem approaches end of downward motion.

Repetitive accuracy is approximately  $\pm 10\%$ . Time delay setting is by adjustment screw. Interrupting capacities are: 110/220v AC inductive single circuit 25 amp, 440/600v 7.5 amp. Double circuit capacity for 110/220v AC is also 25 amp, but 440/600v capacity is reduced to 3.0 amp. Unit will also handle DC inductive and non-inductive although maximum interrupting capacity is 0.6 amp.

(Pneumatic time delay relay is product of General Electric Company, Dept. CP, One River Road, Schenectady 5, N.Y. Check 1163 opposite last page.)

**Tabulates rotameter sizing data**

Tables and graph summarizing sizing data simplify rotameter selection. Two-color bulletin of 12 pages illustrates principles and applications of complete line.

Bul 18RG is available from Schutte and Koerting Co., Dept. CP, Cornwells Heights, Bucks County, Pa. Check 1164 opp. last page.

wherever precise flow  
measurement is critical . . .

# Potter TURBINE TYPE FLOWMETER

ACCURATE, DEPENDABLE POTTER FLOWMETERS are being specified by more and more chemical processors each year for jobs that demand high reliability, high precision, low maintenance, extreme control precision. Available in sizes from 1/8" to 6" units, they measure caustics, acids, corrosives, unstable compounds, suspensions, super-refined liquids and other hard-to-handle liquids at temperatures up to 1200°F and at pressures to 35,000 psi. Easily incorporated into complex control systems because of their linear output, Potter sensing units produce a signal that can be telemetered, fed into digital information handling systems, or measured directly to indicate or control flow rate or total flow. Find out how this unique approach to flow measurement can help solve your flow-control problems. Write for Bulletin S-1.

POTTER AERONAUTICAL COMPANY • Route 22 • Union, N. J. • Phone MUrdock 6-3010  
Makers of "Potter Engineered" products

When inquiring check 1165 opposite last page

# TEFLON<sup>®</sup>

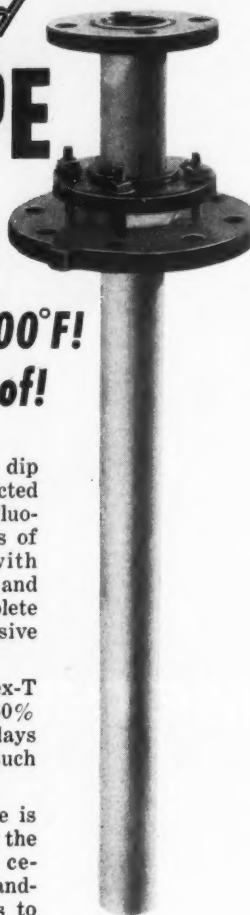
## Laminated DIP PIPE

- ★ **Won't break!**
- ★ **Withstands 500°F!**
- ★ **Corrosion-proof!**

Here are non-contaminating dip pipes and spargers constructed for freedom from trouble. Fluoroflex-T pipe has laminations of glass fibre impregnated with Teflon. The one adds strength and rigidity and the other complete inertness to hot, highly corrosive chemicals.

In one test case, Fluoroflex-T dip pipe was immersed in 50% hydrofluoric acid for 150 days without any visible effect. Such performance is typical.

Best of all, this inert pipe is fracture-proof...eliminating the problem encountered with ceramics or glass. Available standard in 2" I.D.; special sizes to 6". Send for Bulletin FTL-2.



### Stress-relieved

### TEFLON STOCK

Fluoroflex-T rods, sheets and tubes are stress-relieved to provide dimensional stability in parts machined from them. Available from stock in a wide range of sizes. Contact us on your needs for the Teflon recognized as tops in quality.

© Teflon: DuPont trademark.  
Fluoroflex: Resistoflex trademark.

## RESISTOFLEX

CORPORATION

ROSELAND, N. J. • WESTERN PLANT: BURBANK, CALIF.  
SOUTHWESTERN PLANT: DALLAS, TEX.

When inquiring check 1166 opposite last page

## corrosion control

Although Sir Humphrey Davy was first to use cathodic protection way back in 1823, to prevent corrosion of English ships, Dow's Texas Division recently came up with two new innovations —

- 1—Well-type anode installation (60' deep)
- 2—Fence-type anode system (surface system)

which, compared to conventional systems, furnish plant with —

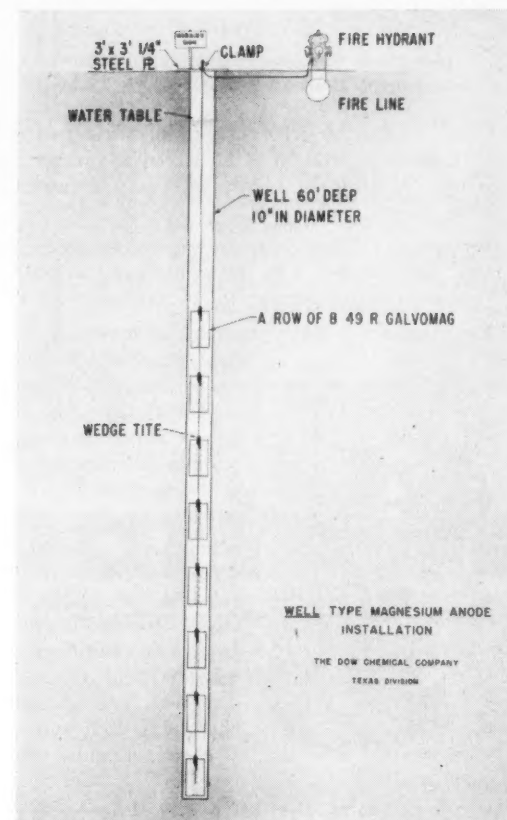
## 60% more current for cathodic protection

**GORDON WEYERMULLER**, Associate Editor  
with **PORTER HART**, Supt. of Inst. Tech. Services  
The Dow Chemical Company, Texas Division  
Freeport, Texas

**Problem:** At Dow's Texas Division, experience has shown that 50% of the conventional anode beds will be damaged by grading, mowers, or other plant maintenance operations, before the useful life of the anodes is expended. Also, conventional method of installing anodes in shallow augered holes does not always get them deep enough below the water table level to furnish maximum current for cathodic protection.

**Solution:** Quite recently Dow developed two new innovations for installing anodes which overcome both of the foregoing disadvantages. These methods are as follows:

- 1—Well-type system — a 60' deep, 10" diameter



hole is augered near a fire hydrant and eight 49-lb magnesium anodes installed in it on a 5/8" diameter stranded copper cable. Cable is covered with a PVC coating. A Crouse-Hinds Wedge Tite fitting is used in the top of each anode to fasten the cable securely. Cable is grounded by connecting it to fire hydrant. Current output is 3 1/2 to 8 amp.

2—Fence-type system — Five 49-lb magnesium anodes are installed 10' apart on cables connected to posts beside a drainage ditch near underground piping to be protected. After anodes are attached they are thrown in center of a high salinity drainage ditch. Cable is grounded by connecting it to a pipe. Current output is 5 to 11 amp.

First well-type anode system was installed at the Freeport plant, April 26, 1956. About 38 are in service now. Plant plans to install about 60 more. About 20 fence-type anode systems are in service. From now on all installations on the plant will be one of the two types.

**Results:** Since anodes used with well-type system are planted much deeper, where there is per-





Hole being augered for well-type installation. Note magnesium anodes on cable at left

manent moisture, they produce 60% more current than same anodes placed in shallow augered holes. Possibility of anode system being disturbed by maintenance operations has been virtually eliminated. Well-type magnesium anodes last 6 to 10 years before requiring replacement.

(Please turn to page 113)



Cable from well-type installation is grounded by connecting it to fire hydrant

**PURITY...  
PROTECTION...  
PERMANENCE...**

**GET ALL 3 WITH LAPP TUFCLAD®**

**SOLID CHEMICAL PORCELAIN  
ARMORED WITH FIBERGLASS-  
REINFORCED PLASTIC**



Y-Valves as shown, and Angle Valves are available in Lapp TUFCLAD Chemical Porcelain in 1/2" to 6" sizes. Also safety valves, flush valves, plug cocks, pipe and fittings (to 8" diam.) and special shapes.

**Lapp**  
**CHEMICAL**  
**PORCELAIN**

Lapp Chemical Porcelain is the ideal material for maintaining strict purity control of product because of its many special characteristics. It is chemically inert, therefore resistant to corrosion from acids of all concentrations (except hydrofluoric); it's hard, dense, pure, homogeneous, close-grained, non-porous.

Now, add the low-cost protection offered by TUFCLAD—an armor consisting of multiple layers of strong fiberglass fabric impregnated and bonded to the porcelain with an Epoxy resin of high strength and chemical resistance. TUFCLAD armor serves as an insulator against thermal shock—a cushion to accidental impact, and is tough and strong enough to hold operating pressures even if porcelain is fractured. This protection to personnel, equipment and product—the purity of Lapp Chemical Porcelain—and low maintenance costs due to the permanence of a Lapp TUFCLAD Chemical Porcelain system merit your investigation.

*WRITE for description and specifications. Lapp Insulator Co., Inc., Process Equipment Division, 823 Wendell St., Le Roy, New York.*

When inquiring check 1167 opposite last page

# Impervite

IMPERVIOUS  
GRAPHITE



"We consider this unit as representing a major innovation for a practicable solution to corrosive heat exchanger problems."

Chief Engineer  
Courtaulds (Alabama) Inc.

## CROSS BORE HEAT EXCHANGER

ANOTHER EXCLUSIVE DEVELOPMENT OF FALLS INDUSTRIES INC.



Design simplicity and heavy-duty construction of IMPERVITE CROSSBORE exchangers consist of only 3 parts: (1) one-piece, fully floating heat transfer cylinder, (2) one-piece header domes, and (3) shell with required nozzles and mounting brackets.

- Accommodates 150-200 psi operating pressures
- Resists greater internal and external mechanical shock
- Unaffected by action of all corrosives except few high oxidizers
- Design simplicity eliminates major maintenance
- Furnished as standard from 21 to 178 sq. ft. transfer surface
- WRITE TODAY FOR CATALOG

**FALLS FI INDUSTRIES INC.**

31909 AURORA ROAD • SOLON, OHIO  
Phone: CHURCHILL 8-5357 • Teletype No. Solon-0-720

When inquiring check 1168 opposite last page

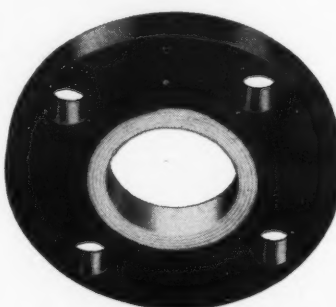
## CORROSION

Only stainless contacted  
by corrosive element  
with insert flange . . .

bi-metal products insure good  
sealing of joints

Uses: For use with process  
piping.

Features: Insert flanges are a bi-metal product. Inserts are of stainless steel and other corrosion-resistant alloys, and flanges are of carbon steel. When unit is assembled and placed in use, only the insert comes in contact with the corrosives.



Corrosion-resistant insert flange

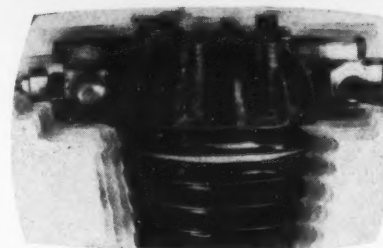
Description: Insert flanges make a rigid flange connection with true machine concentric grooves on gasket face to insure maximum sealing for leak-proof joints. Units are available in sizes up to 12" IPS.

(Insert flanges are product of Stainless Insert Flange Co., Dept. CP, 6526 Upland Street, Philadelphia 42, Pa. Check 1169 opposite last page.)

Tells about vinyl coating  
up to 60 mils thick

Four-page illustrated bulletin tells about a sprayable plastic coating which can be applied up to 60 mils thick in a single application. Product resists a wide range of acids, alkalis, and other corrosives.

Bul SP-1 is issued by Metal & Thermit Corporation, Dept. CP, Rahway, N.J. Specify 1170 opposite last page.



VIBRATION  
DOES NOT  
CRACK OR  
FISSURE THE  
PLASTIC SEAL

for those hard-to-hold  
liquids and gases

Leak Lock is a truly remarkable joint sealer, as its plastic base holds chemical solutions and gases that quickly penetrate ordinary sealers.

Leak Lock adheres firmly to most surfaces . . . steel, iron, copper, aluminum, cork, asbestos, plastics, etc., and stays flexible indefinitely. It is the real answer to those difficult leaking joint problems. Stewart Industries, Inc., 16 Colfax Ave., Clifton, N. J.

Send for FREE  
SAMPLE for  
test purposes

*Leak Lock*

When inquiring check 1171 opposite last page

## KNOW YOUR PAINT COSTS

FREE BOOK makes it easy!

When you have the facts it is easy to select paints of proved performance and to plan your maintenance painting program for greatest efficiency. Substantial savings can be effected. It provides complete records of areas painted, dates, brands used, quantities, costs and durability. All buildings and equipment can be included. It eliminates guesswork and becomes your guide to better painting for years to come. Your letterhead request brings a free copy of this file-size, 24-page book. Write today!



**TROPICAL PAINT COMPANY**  
1128-1204 W. 70th, Cleveland 2, Ohio  
HEAVY-DUTY MAINTENANCE PAINTS SINCE 1883 • SUBSIDIARY OF PARKER RUST PROOF COMPANY

When inquiring check 1172 opposite last page

CHEMICAL PROCESSING



## Cathodic Protection

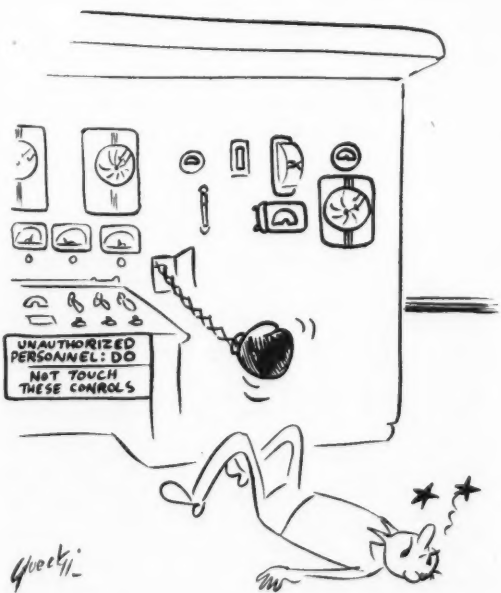
(Continued from page 111)



Fence-type anode installation. After connecting to cable, anodes are thrown in ditch

Labor costs for fence-type anode system are low since it is installed above ground. Water in drainage ditch is, of course, an excellent conducting medium. It is estimated that a fence-type system will produce 60 to 70% more current per dollar spent than conventional magnesium anode planting methods. Anodes used in fence-type system last two years. They can be replaced in 1/2 hr.

(For further information on cathodic protection systems contact The Dow Chemical Company, Midland, Mich. Check 1173 on form opposite last page.)



Sangamo Electric Co., Springfield, Illinois

## That spray tree died every 60 days ...until they installed Koroseal

It used to be that a day a week was spent in maintenance on that air wash system. Even then, every 30 to 60 days the pipe had to be replaced. Hydrochloric acid and nitric acid fumes were too corrosive for the steel pipe to handle.

Then a B.F. Goodrich Koroseal salesman suggested rigid Koroseal pipe. It has been in operation for more than a year now and shows no sign of deterioration. The weekly maintenance expense has stopped too.

Using Koroseal polyvinyl chloride to handle corrosive materials has solved an expensive maintenance and replacement problem for many progressive manufacturers. Your corrosion problem may be solved by Koroseal too.

Koroseal PVC is unaffected by most alkalis and acids. It is completely inert in the presence of oil, alcohol and salt solutions. Unusually strong, it has high impact resistance.

Koroseal rigid pipe is exceptionally easy to install. It can be threaded with standard pipe threading equipment, quickly joined to Koroseal valves and fittings. It is available in various pressure schedules. Koroseal PVC comes in tubing, valves, rods, sheets and can be welded, sawed, drilled and machined. It has excellent insulation properties, will not support combustion, never needs painting. For more information fill in and mail the coupon at the right.

B.F. Goodrich Industrial Products Company, Marietta, Ohio.

### B.F. Goodrich

INDUSTRIAL PRODUCTS CO.

B. F. Goodrich Industrial Products Co.  
Dept. CP-1  
Marietta, Ohio

Please send me free booklets on:

- ☐ Rigid Koroseal Pipe  
☐ Rigid Koroseal Sheet

Name \_\_\_\_\_

Company \_\_\_\_\_

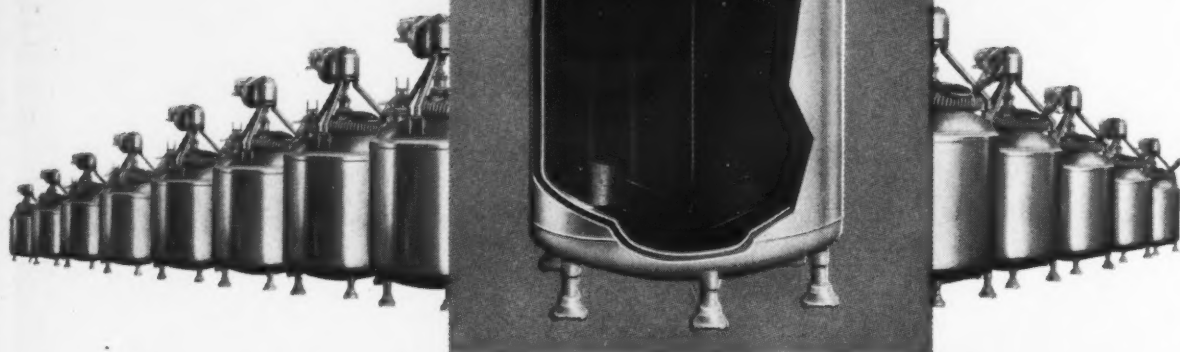
Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

Koroseal—T. M. Reg. U. S. Pat. Off.

When inquiring check 1174 opposite last page

If your process  
demands a  
custom-built  
reactor, Glascote®  
builds it  
that way...



## ...if a standard reactor will do— Glascote can help you too

AVAILABLE IN A RANGE FROM  
300 TO 2000 GALLON CAPACITIES

Our standard one-year guarantee continues  
to apply to all Glascote glass-lined products.

# Glascote®

PRODUCTS, INC.

Sales offices or agents located in  
New York • Philadelphia • Union, N. J. • Chicago • Cleveland  
Dayton • Houston • Los Angeles

Export Sales: A. O. Smith Corp., International Division,  
Milwaukee 1, Wisconsin

A subsidiary of **A.O. Smith Corporation**  
World's largest manufacturer of glass-lined steel products



When inquiring check 1175 opposite last page

### CORROSION CONTROL

#### Floor mastic resists acids and alkalis...

product can be used to resurface wood, concrete, or steel

**Uses:** Mastic can be used to completely resurface existing wood or concrete floors or to patch rutted, splintered, or damaged areas in floors or walls. It can also be used for repairing truck beds, or resurfacing the interior of concrete or steel tanks.

**Features:** Coating has excellent resistance to acids and alkalis.

**Description:** Coating is a thermosetting plastic incorporating inert minerals. Product has good adhesion to cement and high abrasion resistance. It can be applied without heating.

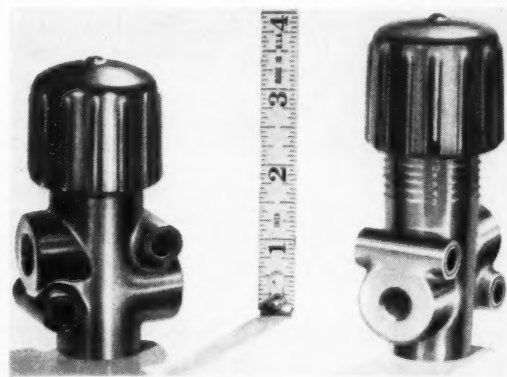
(Floor-Nu coating is product of Steelcote Manufacturing Co., Dept. CP, 3418 Gratiot St., St. Louis 3, Mo. . . or for more information check 1176 on form opposite last page.)

#### Continuous duty at 170 psi not too tough for PVC valves...

at lower pressures can be used safely at 170°F

**Uses:** For general chemical handling, water treatment, oil refineries, agricultural chemicals, laboratory applications, corrosive gases, paper and pulp industries, and other applications.

**Features:** Products have been designed to withstand high temperatures and pressures on conventional plastics. Valves can be used in continuous duty at pressures up to 170 psi. At lower pressure systems they can be used safely at temperatures up to 170°F in continuous duty—higher for intermittent service. Valves have excellent corrosion resistance.

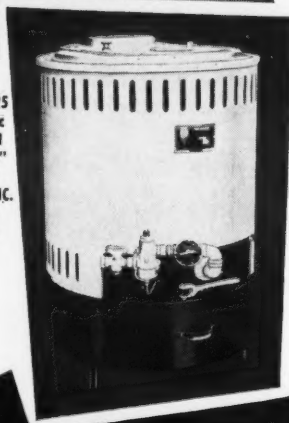


PVC valves can be mounted in a number of different positions for varied applications





Model S-25  
Automatic  
Gas Fired  
"INCINOR"  
Mfd. by  
BOWSER, INC.  
finished  
in white  
SICON



The sparkling white finish of  
this home incinerator stands  
flash temperatures of as  
high as **550°F.**

## It's Sicon Silicone Coating

SICON withstands the shock of  
high heat combustibles without  
peeling or blistering. Retains  
luster and beauty over long pe-  
riods of time. Now used on all  
INCINOR models. SICON, the origi-  
nal silicone finish, has proved  
best for a long list of other na-  
tionally known products.

WRITE  
Dept. A-3

# Sicon

Silicone-Based Finish is  
manufactured exclusively by

## MIDLAND

Industrial Finishes Co.  
Waukegan, Illinois  
ENAMELS • SYNTHETICS  
LACQUERS • VARNISHES

When inquiring check 1177  
opposite last page

JANUARY 1957

## CORROSION CONTROL

**Description:** Valves are available in 1/8 and 1/4" pipe sizes and two types, needle valve and a globe valve. Many different types of mounting arrangements can be used on each type.

Needle valve has a rising spindle with a Kel-F needle designed to obtain a positive seat with fingertip control without danger of sticking or galling. Body is graduated similar to a micrometer and an indicating point on handle allows specific settings to be obtained and recorded to a fine degree. Kel-F needle assures positive shut-off and low pressure drop with an offset design. Quad ring seal provides a good seal against either pressures or vacuum.

On the globe valve, the seating disc is non-sticking Teflon. Valve has O-ring spindle seals and the working parts are sealed against interior and exterior corrosion. Non-rising stem is actuated by a double lead thread from full open to close in three turns, yet allows throttling.

(PVC valves are a product of Chemtrol Corp., Dept. CP, 11008 Santa Fe Ave., Lynwood, Calif. Check 1178 opposite last page.)

### Slip-on pipe caps of neoprene prevent internal corrosion of stored pipes . . .

protect expensive alloys from corrosive fumes,  
dust, and moisture

**Uses:** For protecting pipe and tubing against costly internal corrosion during storage. Caps are equally effective for protecting heat exchanger tube bundles and other tubular products.

**Features:** Caps effectively seal out air, moisture, corrosive fumes, and dust. Neoprene construction permits caps to stand up to rough handling and repeated re-use. Neoprene is highly resistant to oil, acids, chemicals, and adverse weather conditions:

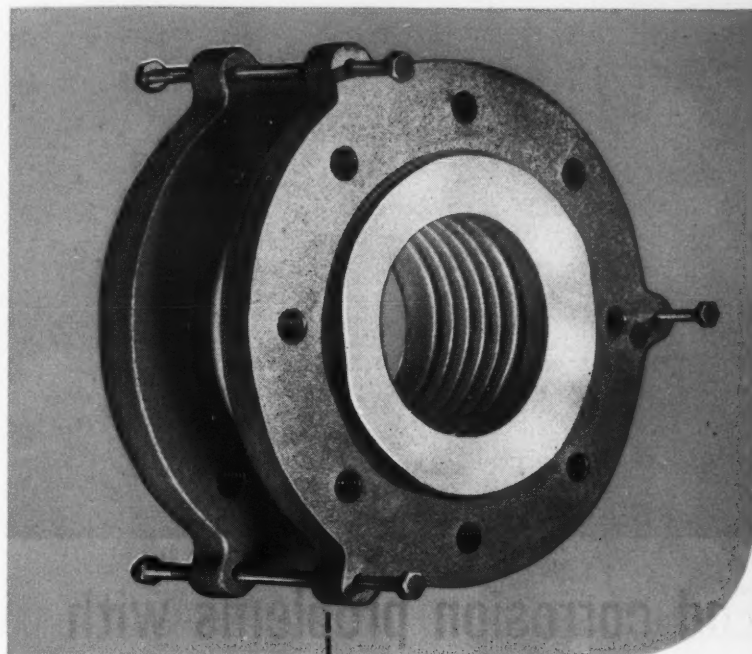
**Description:** If a small amount of dehydrating agent is added before caps are slipped on, the inside of expensive alloy tubing will be fully protected. Caps also keep threads free of sand and grit. Caps are available for piping from 2" to 20".

(Neoprene slip-on end caps are made by Protokap, Inc., Dept. CP, 625 West Bldg., Houston, Tex. . . . or check 1179 opposite last page.)



Protects costly alloy tubing

## they supply the "GIVE and TAKE" for safe piping seals



made of du Pont  
**TEFLON**

Chemiseal Expansion Joints and Flexible Couplings—Made of TEFLON—protect costly chemical piping, usually low in impact strength.

They absorb shock, vibration, thermal expansion and contraction. Correct misalignment. Connect unlike piping ends and nozzles. Eliminate gaskets, adaptors and slip joints. Are impervious to all chemicals excepting only molten alkali metals, fluorine under pressure and chlorine trifluoride.

All TEFLON Expansion Joints and Flexible Couplings are pressure tested at the plant . . . and flexural tested, too, for special requirements.

Write for Bulletin EJ-1155.



## UNITED STATES GASKET CO.

CAMDEN 1, NEW JERSEY

When inquiring check 1180 opposite last page

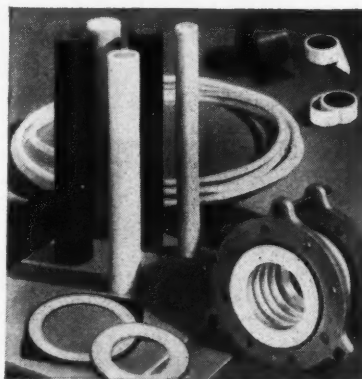
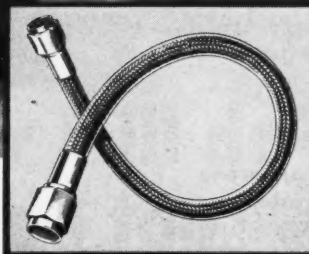


## End corrosion problems with R/M FLEXIBLE THIN-WALL *Teflon* HOSE

R/M's Flexible Thin-Wall "Teflon" Hose offers you an ideal solution to all kinds of corrosion problems. Made in two forms—wire braided and rubber covered—R/M "Teflon" Hose is impervious to all industrial acids, caustics and solvents. It is noncontaminating and nonabsorbent, will not harbor bacteria. It is relatively impermeable to most chemicals. It has good heat resistance, is capable of continuous service at 400°F, holds its toughness and flexibility even at extremely low temperatures.

R/M "Teflon" Hose is produced in a wide range of inside diameters and wall thicknesses. Write us for Bulletin 6700 and feel free to call on us for help in solving hose problems.

Other R/M "Teflon" products for the chemical industry include rods, sheets, tubes and tape; centerless ground rods held to very close tolerances; stress-relieved molded rods and tubes; gaskets, expansion joints and flexible couplings; bondable tape and sheets for linings; Raylon—R/M trade name for mechanical grade "Teflon"—having many characteristics of virgin "Teflon." For complete details call or write R/M. \*A Du Pont trademark



### RAYBESTOS-MANHATTAN, INC. PLASTIC PRODUCTS DIVISION, MANHEIM, PA.

FACTORIES: Manheim, Pa.; Bridgeport, Conn.; No. Charleston, S.C.; Passaic, N.J.; Neenah, Wis.; Crawfordsville, Ind.; Peterborough, Ontario, Canada

RAYBESTOS-MANHATTAN, INC., Engineered Plastics • Asbestos Textiles • Mechanical Packings • Industrial Rubber • Sintered Metal Products • Rubber Covered Equipment  
Abrasive and Diamond Wheels • Brake Linings • Brake Blocks • Clutch Facings • Laundry Pads and Covers • Industrial Adhesives • Bowling Balls

When inquiring check 1181 opposite last page

### CORROSION CONTROL

#### Plastic pump is portable and self-priming . . .

has phenolic body and neoprene impeller

**Uses:** For general transfer applications in chemical, pharmaceutical, food, and other industries.

**Features:** Pump is fabricated of corrosion-resistant materials. It has a phenolic type plastic body with a neoprene impeller, mounted directly to motor drive shaft.

**Description:** Plastic pump and motor unit is close-coupled, portable, and self-priming. Pump body is provided with 1/2" inlet and outlet ports designed to accommodate standard piping. Capacity is 10 gpm against a 10' head. It is suitable for use up to 20 psi pressure with a dry suction lift approaching 15'. Unit weighs approximately 30 lb.



For pumping corrosives

(Plastic pump is product of Jabsco Pump Company, Dept. CP, 2031 N. Lincoln St., Burbank, Calif. . . or for more information check 1182 on form opposite last page.)

#### Special copper alloys listed

Tabulation of non-standard, wrought-copper-base alloys is contained in one-page list. It is a compilation of special copper alloys not listed in Copper and Brass Research Association's Manual of Standards. List provides trade name, generic name, nominal composition, forms available, typical applications, and mill source for each alloy.

Copper Alloys list may be obtained by writing to Copper & Brass Research Association, 420 Lexington Ave., New York 17, N. Y. . . or check 1183 on form opposite last page.

**You must qualify  
to receive this magazine**

CHEMICAL PROCESSING is edited for key processing men such as you. Why do you receive it without subscription charge?

See page 93



## CORROSION

### **Teflon tape available in wide variety of gages, sizes . . .**

fifteen gages are furnished  
from 0.002 to 0.125"

**Uses:** For high-frequency,  
high temperature insulation, for  
chemical gasketing, and for other  
applications.

**Features:** Teflon tape is avail-  
able in a wide variety of gages  
and dimensions.

**Description:** Fifteen gages of  
Teflon tape from 0.002 to 0.125"  
are currently available. Tolerance  
on gage ranges from  $\pm 0.0005$ "  
on thin stock to  $\pm 0.002$ " on  
thicker gages. Tape can be speci-  
fied from stock in widths rang-  
ing from  $\frac{1}{2}$  to 12".

(Teflon tape is a product of Tri-  
Point Manufacturing, Inc., Dept.  
CP, 401 Grand Street, Brooklyn  
11, N.Y. . . . or for more infor-  
mation check 1184 on form  
opposite last page.)

### **Epoxy coating protects against moisture and chemicals . . .**

has excellent adhesion even  
with wide temp changes

Recently announced epoxy coat-  
ing protects against fumes, mois-  
ture, and drippage of a wide  
variety of chemicals. Non-po-  
rous film has a superior ability  
to withstand impact and abra-  
sion and retains excellent adhe-  
sion even during extreme tem-  
perature changes. Coverage is  
from 300 to 1000 square feet  
per gallon.

(Poxycote is a product of Na-  
tional Coating Products, Inc.,  
Dept. CP, 207 West 16th Street,  
New York 11, N.Y. . . . or for  
more information check 1185 on  
convenient Readers Service slip  
opposite last page.)

For more information on prod-  
uct at right, specify 1186 . . .  
see information request blank  
opposite last page.

**result of an  
engineer's  
good  
common  
sense**

**Pre-fabrication saves time, space  
and money when B&W Seamless  
Welding Fittings are used!**



The engineer on this job knows his business. He speci-  
fied B&W Seamless Welding Fittings and arranged for  
pre-fabrication. Think of the time, space and money  
he's saving management.

And there's no question of the pre-fabricated sections  
fitting when they're ready to be installed, because  
they're dimensionally accurate. Full radius, true circu-  
larity and smooth walls of exact thickness permit fast  
alignment and easy fit-up.

This time, specify B&W Seamless Welding Fittings  
for a permanent, leakproof piping system. Seamless  
Welding Fittings allow piping to nest closer, are strong-  
er, yet weigh considerably less than other types of fit-  
tings. They're available in a complete range of sizes  
and types in carbon and the B&W CROLOYS.

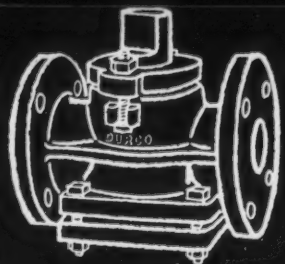
**THE BABCOCK & WILCOX COMPANY**  
TUBULAR PRODUCTS DIVISION • FITTINGS DEPARTMENT  
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THE  
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FITTINGS



FA-7905-FE

Seamless welding fittings and forged steel flanges, seamless and welded tubular products — in carbon, alloy and stainless steels.



X 100,000

= Durco Type F Valves  
Sold since 1951

*This "product" may solve your chemical service problems!*

100,000 Durco Type F Valves in six short years is ample testimony of the performance of these valves in tough chemical service—especially when practically all of them are *still in service*.

With the recent introduction of the 3-inch size, Durco Type F Valves (1/4" through 3", inclusive) offer the broad size range needed for a large majority of applications. Their simple design and the corrosion resistance of Durco alloys and Teflon sleeves extend their versatility.

Full details in free Bulletin V/4b.

Manufactured under one or more of the following patents. U. S. Patent Nos. 2713987, 2729420, 2735645, 2728550. Patented in Canada, 1955, No. 519424.



**THE DURIRON COMPANY, INC., DAYTON, OHIO**

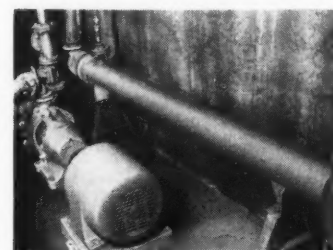
Branch Offices: Atlanta, Baltimore, Boston, Buffalo, Chicago, Cleveland, Dayton, Detroit, Houston, Knoxville, Los Angeles, New York, Philadelphia and Pittsburgh.

## CORROSION

### Heating and cooling done by graphite heat exchanger in plating plant

Nickel plating solutions are being both heated and cooled by the same heat exchanger at Michigan Plating & Stamping Company, Grand Rapids, Michigan. Use of only one unit to perform both of these operations is resulting in substantial savings.

The unit used is a single-pass, impervious graphite heat exchanger having 21.2 sq ft of heat transfer surface. It can heat 7000 gal of solution from 95 to



Graphite heat exchanger (right) is used to both heat and cool nickel plating solutions at Michigan Plating and Stamping Co.

160°F in about six hours. Heat transfer coefficients of 200 Btu/hr/sq ft/°F have been observed. The exchanger is used to cool bath during actual plating.

Of simple, rugged construction, unit consists of three major parts: 1) a one-piece "fully-floating" impervious graphite heat transfer cylinder, 2) one-piece header domes, and 3) shell with required nozzles and mounting brackets. It has good resistance to mechanical shock and can withstand 150-200 psi at 340°F.

(Model CB-6 "Cross-bore" impervious graphite heat exchangers are product of Falls Industries, Inc., Dept. CP, Aurora Road, Solon, Ohio. Check 1187 on form opposite last page.)

For more information on product at left, specify 1188 . . . see information request blank opposite last page.

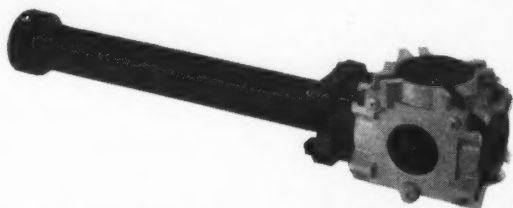


### Armor for carbon pipe prevents breakage and leaks . . .

adds to advantages of corrosion-resistant chemical piping

**Uses:** For a variety of applications in the chemical process industry.

**Features:** Armor strengthens the pipe and in case of breakage, it remains intact, holding line pressure and preventing gross leakage. Armor also serves to increase safety.



Armoring of impervious graphite pipe widens application in chemical field

**Description:** Armor consists of a strong glass fabric bonded to manufacturer's Karbate impervious carbon pipe. Connections to flanged fittings are made through a protective metal housing, which isolates fitting from external mechanical stresses caused by misalignment or piping expansion or contraction. Advantages of the armor are now added to the corrosion resistance, freedom from metallic contamination, and resistance to thermal shock of the carbon pipe. Armored pipe is available in 1" to 4" diameter in lengths up to 9'.

(Armored Karbate pipe and fittings are product of National Carbon Co., Div. of Union Carbide and Carbon Corp., Dept. CP, 30 East 42nd Street, New York 17, N.Y. . . or for more information check 1189 on the convenient Reader Service slip which is located opposite last page.)

### Flexible plastic tubing — 28 pages of data

Twenty-eight page booklet on flexible plastic tubing covers a number of formulations in detail and presents the applications and limitations of each formulation. Physical properties and chemical resistances are presented in chart and table form. Actual applications are also given.

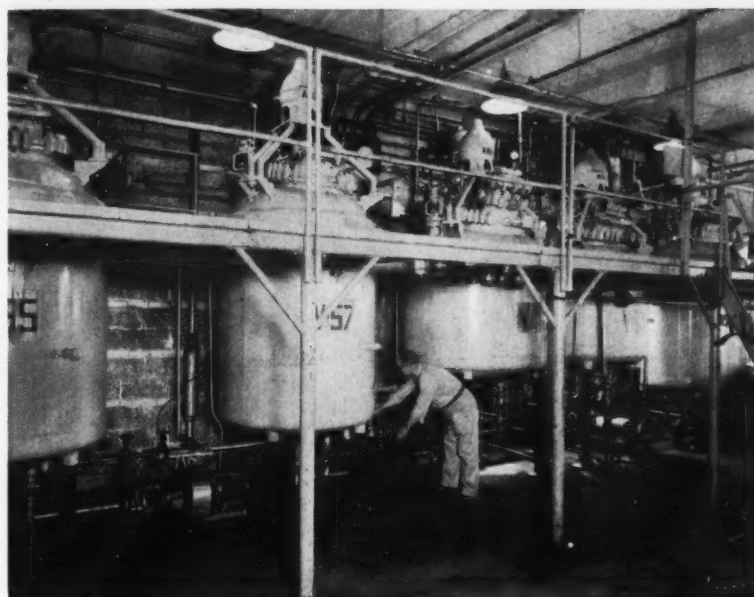
Bul T-97 is issued by Plastics and Synthetics Div., The U.S. Stoneware Co., Dept. CP, Akron 9, Ohio. When inquiring specify 1190 on the convenient Reader Service slip which is located opposite last page.

# Corrosioneering News

Quick facts about the services and equipment available to help you reduce corrosion and processing costs.



Published by The Pfaudler Co., Rochester, N.Y., U.S.A.



Bristol markets some 70 products for human consumption so the need for versatile processing equipment is vital. Pfaudler glassed steel reactors of the type shown answer this need, and help to keep over-all costs down. Frequently, standard designs can be adapted, thus reducing initial costs.

## How Bristol Laboratories makes glassed steel work harder in new product development

Any company faced with the combined problem of providing facilities that assure product purity while minimizing corrosion can profit from the experience of Bristol Laboratories, Syracuse, New York.

Research pilot plant procedures and quality control of production are all part of the routine of getting new products to market. Key link between research and production, of course, is the pilot plant. Long ago Bristol saw the necessity of having process equipment that is inert enough to permit handling most of the corrosives encountered, particularly HCl.

**Need heat exchangers or reactors fast?** You can now get two-week delivery on Type 316 stainless steel single- and double-pass heat exchangers from 56 to 316 sq. ft. in size; also ten-day delivery on standard glassed steel reactors from 50 to 2000 gallons capacity.

For example, the production of Polycycline, Bristol's trade name for tetracycline, involves several steps, including direct fermentation and acetylation. Corrosion is a serious problem in the latter step. It must be avoided or the product would become contaminated.

Pfaudler steam jacketed, glassed steel vessels solved this problem economically. Resistant to all acids, except HF, and all alkalis up to pH 12 at 212° F., it gave Bristol Labs better protection than any other material of construction. Because this glass is inert, there are no undesired side reactions. Adherence is no problem. This makes cleaning and maintenance easier and quicker. Change-over time is reduced to the minimum. Output is, therefore, greater.

These are some of the advantages you gain with Pfaudler glassed steel. It gives you the versatility you need in meeting today's highly competitive markets.

### FACTS YOU SHOULD KNOW . . .

**Recovering waste acids.** Large savings have been realized by removing water from dilute acids in the waste of plating solutions. Pfaudler has developed a remarkably efficient system which has proved itself in many companies.

**Getting more for your heat exchanger dollar.** By stockpiling standard parts which offer great flexibility in heat exchanger design, Pfaudler offers you substantial cost savings besides faster deliveries.

**Continuous centrifuging.** The Titan Superjector is far superior in performance to any other type for (1) continuously removing solids from one or two liquids (2) for continuously concentrating solids by removing liquid from slurries and discharging solids in a predetermined dry state.

**Speeding up evaporation.** A new Pfaudler wiped film evaporator greatly increases evaporating capacity through fast heat transfer, preventing product deterioration, improving quality control, saving initial costs, reducing space requirements.

**Column design.** Pfaudler tray- and packed-type columns of glassed steel or alloy materials are designed to give you high vapor and liquid capacity, low vapor pressure drop, good efficiency under high and low loads (and mildly unsteady loads), easy installation and cleaning.

Information about these products is yours for the asking. Just check what you want in the form below and you'll have it by return mail. If that isn't soon enough call your nearest Pfaudler sales office.

#### THE PFAUDLER CO.

Dept. CPH-1, Rochester 3, N. Y.

Send me more information about  
☐ waste acid recovery systems  
☐ heat exchangers ☐ Titan Superjector centrifuges  
☐ Pfaudler film-type evaporator ☐ Pfaudler columns  
☐ Glassed steel reactors ☐ other products

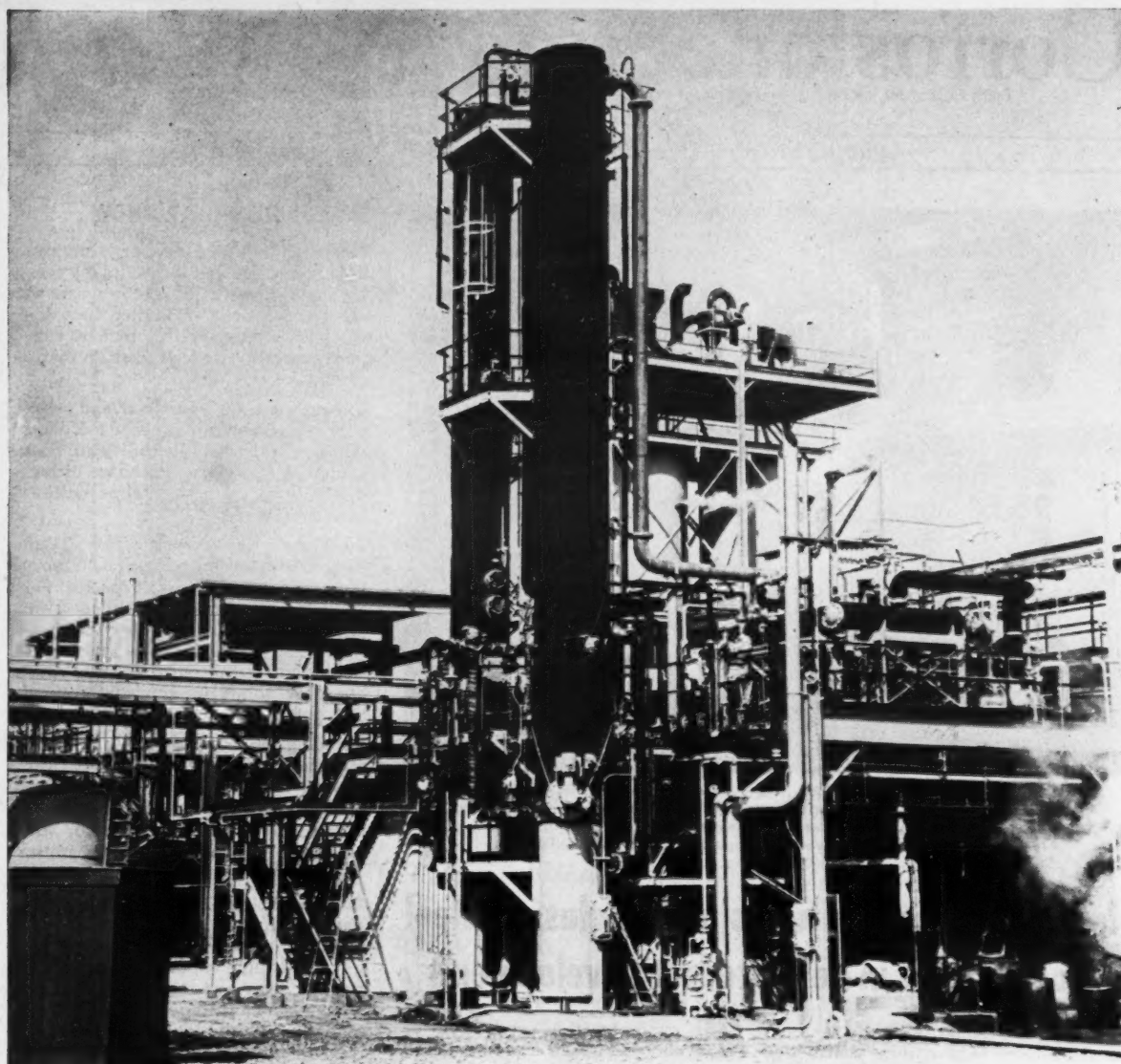
Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_ Zone \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

When inquiring check 1191 opposite last page



## Product spoilage eliminated in phenol plant by *Carpenter* Stainless Tubing!

Oxide discoloration was imparted to the phenol by carbon steel tubes first used in this phenol plant. A change to Carpenter Stainless Tubing has ended this problem permanently. Compare Carpenter quality, and you'll install Carpenter Stainless Tubing for your own processing applications.

MEMBER



**The Carpenter Steel Company,  
Alloy Tube Division, Union, N. J.**

Export Dept.: The Carpenter Steel Co., Port Washington, N.Y.—"CARSTEELCO"



When inquiring check 1192 opposite last page

## CORROSION CONTROL

### Motor life extended eightfold with epoxy-protected windings at American Potash

Unit has served continuously for two years;  
previous windings lasted three months

**Problem:** Motor had to be rewound every three months when used to drive centrifuge basket for lithium mixed sulfate at American Potash and Chemical Co.'s Trona, Calif., plant. Motor is 30-15 hp, 1100-550 rpm, 440v AC. It is installed vertically above basket, subject to all fumes liberated in centrifuging operation.



One of 100 close-coupled, epoxy-protected motors  
used at American Potash

**Solution:** In 1954 motor was rewound and wiring protected by insulating with Epoxylite process. Process involves encapsulating windings in a dense, void-free, capillary-free epoxy resin. Material is applied without use of solvents, is chemically inert, and will not swell or degrade in oil, plasticizers, and solvents.

Typical physical properties of resin	
Dielectric constant (25°C)	3.8
Arc resistance, sec	120
Dielectric strength, volts/mil	400-500
Tensile strength, psi	8000
Elongation, %	1.5

In addition to centrifuge motor, units used to drive pumps which transferred solution containing borax, potash, bromine, and a number of other chemicals into processing plant, were similarly protected. These motors were constantly exposed to caustic fluid spray, and temperatures that varied from 120°F to below freezing.



## CORROSION CONTROL

**Results:** Centrifuge motor on lithium mixed sulfate service has served more than two years without a failure despite constant exposure to conditions which caused previous windings to fail within three months. Motors on other operations, also protected with the epoxy coating have given excellent service. Insulation on these motors, when brought in after service is sometimes encrusted with a coating of brine and caustic residue two to three inches thick.

(Epoxy encapsulating process is available from motor repair shops licensed by The Epoxylite Corp., Dept. CP, 812 Truck Way, Montebello, Calif. . . . or for more information check 1193 on form opposite last page.)

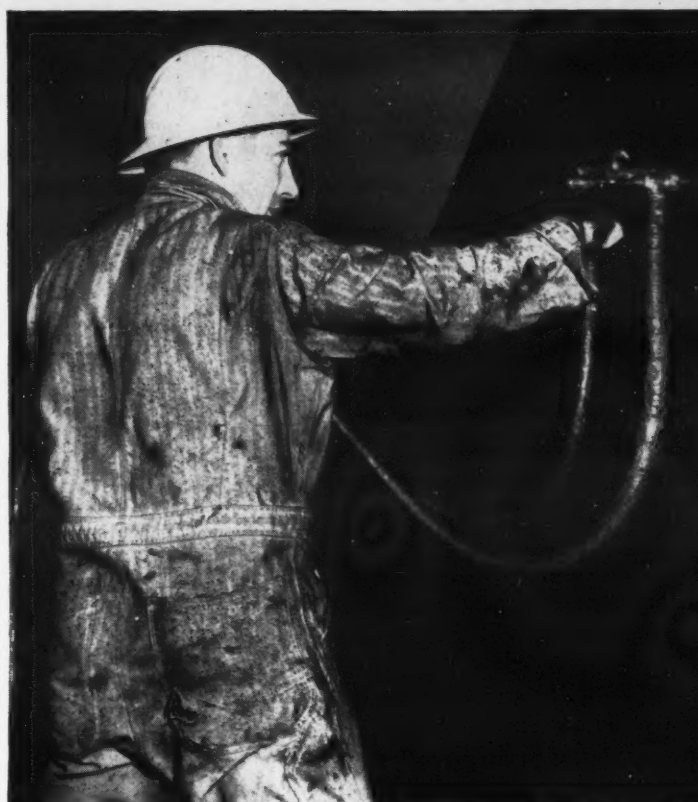
### Corrosion-resistant carbides — design applications

Bulletin of 24 pages describes tungsten, titanium, and other carbides developed for high wear and corrosion resistance at elevated temperatures. Physical and mechanical properties are given for various compositions, including actions of the most corrosive agents among acids, alkalis, and salts. Separate section lists suggestions for design applications.

Bul B-111 is issued by Kennametal Inc., Dept. CP, Latrobe, Pa. When inquiring specify 1194 on form opposite last page.



"Krocket, what's this nonsense about there being corrosive fumes in the building?"



## Here's how *Insul-Mastic* PROPERLY PROTECTS Industrial Equipment . . . at LESS COST!

You gain *all the essentials* when you specify Insul-Mastic to protect your plant and equipment investment against weather and damaging industrial vapors.

*First*, you gain the benefits of recognized superior products. For example, Insul-Mastic Type D has a record of performance 5 to 10 times longer than ordinary mastics. One of the reasons for this extreme serviceability is the higher content of "Gilsonite", probably the most resistant and stable material used in mastic coatings. Worth remembering, many coatings contain *no* "Gilsonite."

*Second*, you benefit from the experience of the pioneer in the mastic coating field. That means *proper application* — and faster application, too.

Putting on the best, costs less no matter how you figure it!

*Think first of the coatings that last!*



# Insul-Mastic

CORPORATION OF AMERICA

7758 WEST 61st PLACE

SUMMIT, ILLINOIS

## Insul-Mastic IN INDUSTRY

- ☐ **VAPOR SEAL MASTICS**  
Eight types to meet every vapor sealing need.
- ☐ **INSULATING MASTICS**  
General purpose Type D—plus a new Fire-Retardant that will insulate a metal surface against reaching 1000°F. for thirty minutes under 2000°F. flame.
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Two types for new roofs or old.
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A lasting color finish developed especially for Insul-Mastic protective coatings. Also for concrete, brick, cinder block, metal trim, porous roofing tile, asbestos shingles, stucco, etc.
- ☐ **MICA INSUL-MASTICS**  
A full line of products for a beautiful lasting coating.
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A unique foamed-in-place insulating material with many uses.
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- ☐ **GLASS MEMBRANE**  
A superior inorganic fabric for reinforcing Insul-Mastic protective coatings.
- ☐ **MASONRY COATINGS**  
Six types provide economical solutions to many masonry problems. White, clear and colors.
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Caulking compounds, mastic and weathersealing cements, primers, thinners and aluminum spray.

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7758 West 61st Place, Summit, Illinois  
Please send information on the products checked  
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City \_\_\_\_\_ State \_\_\_\_\_

When inquiring check 1195 opposite last page

# DIAMOND

## ROLLER CHAINS

### OF TODAY . . .



### MEET STILL HIGHER STANDARDS OF UNIFORM QUALITY

New procedures and methods are always in process at Diamond—research, specialized engineering, experiment and testing, newer heat-treating methods, *preloading*, *shot-peening*, better raw materials. You get all this and over 65 years of manufacture with skilled craftsmen and most modern equipment, only at Diamond.

There is practically no end to the applications of Diamond Roller Chains. Our engineering staff is ready at all times to make practical recommendations.

#### DIAMOND CHAIN COMPANY, Inc.

Dept. 411, 402 Kentucky Ave., Indianapolis 7, Indiana

Offices and Distributors in All Principal Cities

Please refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER

# DIAMOND



# ROLLER CHAINS

When inquiring check 1196 opposite last page

## packaging & shipping



Polyethylene container prevents liquid detergent waste, allows easy dispensing

Designed for packaging products ranging from household detergents to dry-powder insecticides for roses, polyethylene and metal container . . .

## *dispenses a squirt or a whoosh in any position*

Recently developed "squeeze can" for light liquids, viscous fluids, or dry powders is constructed with polyethylene walls combined with a metal top and bottom. By squeezing the pliable side walls, resulting bellows action dispenses the contents . . . liquids or powder. Dispensing action, which can be controlled by the squeeze pressure, provides a spray for light liquids, a stream emission for viscous fluids like liquid detergents, or an atomized "whoosh" of powder, depending on the engineering of the container.

Container combines functional characteristics of the

familiar and popular squeeze bottle with the size and appearance of the low cost metal can. Costs on polyethylene/metal unit run to around a penny or two more than the metal counterpart, and as polyethylene prices decrease this margin is expected to decrease. Lower shipping weights, however, help defray part of the additional cost.

For handling liquids, cans are generally made in two sizes, 12 ounces ( $5\frac{1}{2}$ " high,  $2\frac{3}{4}$ " diameter) and the 22-ounce size ( $6\frac{7}{8}$ " high,  $3\text{-}3\frac{1}{16}$ " diameter). In the liquid package, the top plate has a circular hole  $9\frac{1}{16}$ " in diameter through which material is





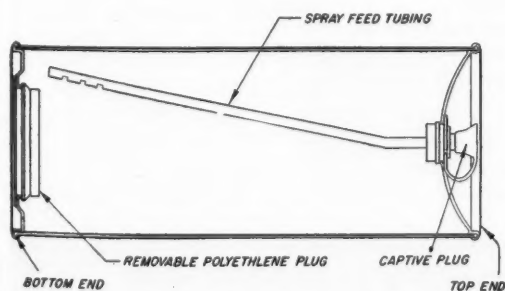
Container design allows dusting at any position

loaded, after which closure and cap are inserted to a positive fit. Generally, wall thickness is .028".

For dry powders, can has polyethylene dispenser plug which friction fits into the metal top. Essential mixing chamber is located just below the plug. Direct air passage along side feed tube introduces air for atomization. Feed tube, about  $\frac{1}{8}$ " in diameter extends to the bottom of the container.

When used in an upright position, squeezing the container side wall forces the powder up through the tube into the mixing chamber where it combines with a stream of air moving through air passage and is forced out the orifice in a finely divided spray. Because of the carefully predetermined size ratio, spray tube and air passage can successfully exchange functions when container is used in an inverted position. Powder then flows through air passage and air moves through tube to mix and form spray. Can dispenses powder in uniform spray regardless of position.

(2ME squeeze can is manufactured by Bradley Container Corporation, Dept. CP, Maynard, Mass. . . . or for more information check 1197 on form opposite last page.)



Dispenser for powders can be refilled through removable plug at bottom



Another first for 3M Research...

## NOW...POLYESTER FILM YOU CAN HEAT SEAL!

Impossible? Not any more! "Scotchpak" Brand Polyester Film takes a seal as tough as the film itself—and easily: a temperature of 275° to 359°F. and 20-60 psi is all that's required.

"Scotchpak" is the perfect packaging material for critical applications where inertness of the wrapper and protection of the contents under extreme temperature conditions is vital. It resists most solvents and chemicals, has high moisture inertness and high tensile strength.

You can use "Scotchpak" for packaging such varied products as cosmetics, acids, syrups, silverware, oils, greases, adhesives, asphaltics, catsup and mustard, surgical dressings—and many others. It even makes an ideal container liner or insulation pillow.

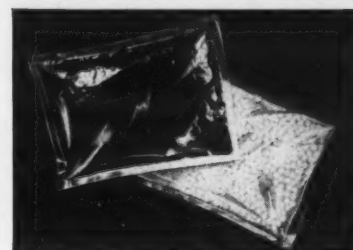
For more information, send for the folder described at right.

TRADEMARK  
**"SCOTCHPAK"**  
BRAND

**HEAT-SEALABLE POLYESTER FILM**

The term "SCOTCHPAK" is a trademark of Minnesota Mining and Manufacturing Co., St. Paul 6, Minn. Export Sales Office: 99 Park Ave., New York 16, N.Y. In Canada: P.O. Box 757, London, Ontario. © 3M Co., 1956.

**Look what you  
can do with it!**



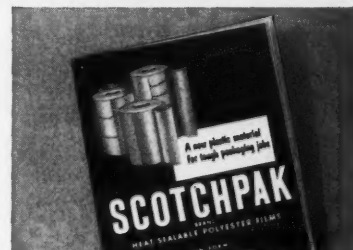
**ACIDS** or volatile chemicals can be packaged easily, handled safely, shipped without fear in heat-sealable containers of new "Scotchpak" Polyester Film. Also lines drums and cartons.



**FOOD ITEMS** are packaged safely in clear-as-glass "Scotchpak" Film. Contents can be frozen . . . even boiled *right in the package*. Low gas penetration rate . . . inert and non-toxic.



**METAL PARTS** can be packaged dry or in oil or grease to protect them against corrosion. Transparent packages are easy to handle, easy to ship and to store. Simplifies issuing of parts and units.



**FREE FOLDER** shows dozens of ways you can solve your most difficult packaging and shipping problems with new "Scotchpak" Polyester Film. Just write on your letterhead: Film Products Group, 3M Co., St. Paul 6, Minn., Dept. OL-17



When inquiring check 1198 opposite last page

**JELLIFF**

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Industry...

**Wire Mesh**

Specializing in the  
non-ferrous metals in counts to  
200 x 200 or 50 x 750 and  
widths up to 48" in all  
commercial weaves

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When inquiring check 1199 opposite last page

# COLTON ROTARY PRESSES

CAPACITIES 65 TO OVER **5000** TABLETS PER MINUTE

**MIXERS—GRANULATORS—OVENS**

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**ARTHUR COLTON COMPANY**

Established 1887

Div. Snyder Tool & Engineering Company  
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When inquiring check 1200 opposite last page

## PACKAGING & SHIPPING

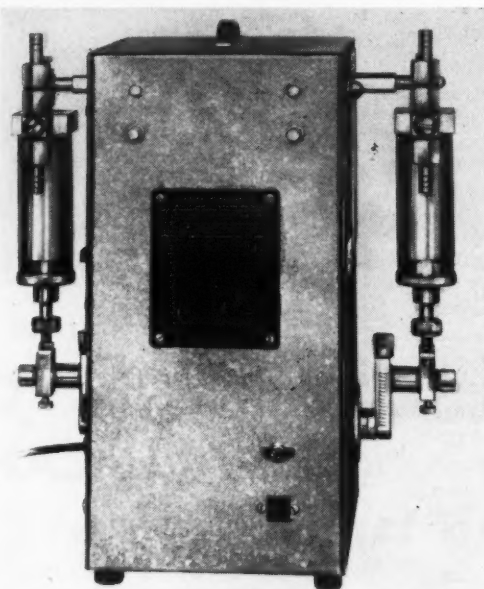
**Fills free-flowing, viscous liquids  
at rates from three to 60 fills  
per minute . . .**

synchronization allows filling of vials  
singly, in two's, or multiples of two

**Uses:** Filler will dispense free-flowing or semi-viscous fluids at rates variable from three to 60 fills per minute.

**Features:** Volume of fill is adjustable from 0.002 ounces to 8 ounces per stroke. Vials can be filled singly, two at a time, or in multiples of two by coupling two or more machines together with synchronizer attachment. Synchronizer also permits unit to be installed on conveyor for completely automatic operation.

**Description:** To operate, inlet hose is simply dropped into reservoir of liquid to be dispensed. Volume of fill is adjusted by means of a calibrated



Volume of fill is adjustable from 0.002 to 8 ounces per stroke

micrometer dial. Dial regulates amount of eccentricity of crankshaft in measured stages of 0.001". Electronic, variable-speed drive provides constant torque at high or low speeds. Filling cycle will repeat automatically or, if desired, can be initiated by depressing foot switch.

In normal use, vials are positioned in a tray and filling nozzles are hand held by operator. For automatic filling, unit can be attached to any standard conveyor line.

(Model DAB-6 vial filler is manufactured by National Instrument Co., Dept. CP, 2701 Rockwood Avenue, Baltimore, Md. . . . or for more information check 1201 on form opposite last page.)



## Every Article in CHEMICAL PROCESSING is "Staff Written"

Every article in CHEMICAL PROCESSING is terse, brief, to-the-point . . . yet packed with essential facts of developments important to every man in chemical processing.

For every article is "Staff Written." Our Editors dig out the vital news-facts, then write them in the fewest possible words. That's why you read so much . . . keep up with developments . . . in short reading time. You don't have to "wade through" long, hard-to-read articles.

It's the most difficult kind of editing, but it pays big dividends to every busy reader.

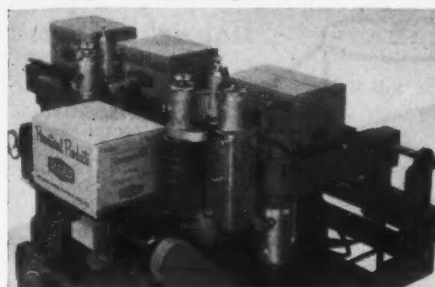


CHEMICAL PROCESSING



## PRINT YOUR "LABEL" RIGHT ON THE PACKAGE

Production-line imprinting machine saves on labelling . . . package costs . . . storage space



Prints anything, from code-date to ad... on any package, from tiny carton to shipping case

Are you using fully preprinted packages for every different product in your line? Are you using labels on your package . . . or imprinting it in a separate operation? You can save money by using a Gottscho MARKOPRINTER® machine to imprint contents descriptions, parts numbers, varieties, codes, flavors, other changeable legends on one or more blank panels of a common container . . . automatically . . . as part of your packaging operation. The MARKOPRINTER machine does away with label and labelling costs, huge inventories of preprinted packages, losses from obsolescence . . . assures lower unit package costs, reduced warehousing and record-keeping labor, no down-time due to lack of right packages at the right time.

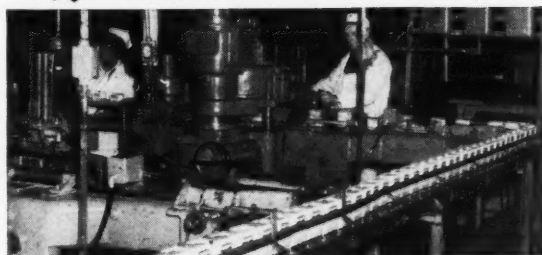
*Gottscho*

Write for descriptive Bulletin "MP"  
**ADOLPH GOTTSCHO, INC.**  
Dept. W, Hillside 5, N. J.

Automatic Production-Line CODING, MARKING, IMPRINTING MACHINES  
In Canada: RICHARDSON AGENCIES, LTD., Toronto & Montreal

When inquiring check 1202 opposite last page

## If you Need Vacuum For Packaging

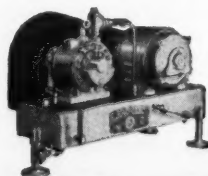


### You Can Get It For Less With a LAMMERT PUMP

Capacities from 4.3 to 225 cubic feet per minute. From medium to high vacuum (up to 20 microns of barometer).



Write for catalog giving specifications of Lammert vacuum pumps and compressors.



**LAMMERT & MANN CO., INC.**  
1753 Walnut Street, Chicago 12, Illinois. SEeey 3-0383

When inquiring check 1203 opposite last page

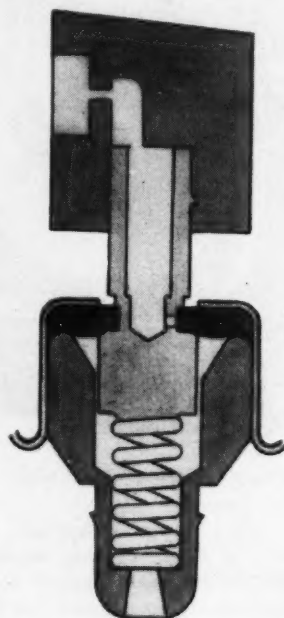
## PACKAGING

### Spray density dictated by three controllable orifices . . .

nylon construction resists corrosion from most products

Uses: Valve is designed for aerosol dispensing of most products. Nylon construction is particularly suited to handling chemicals that would tend to corrode metal valves.

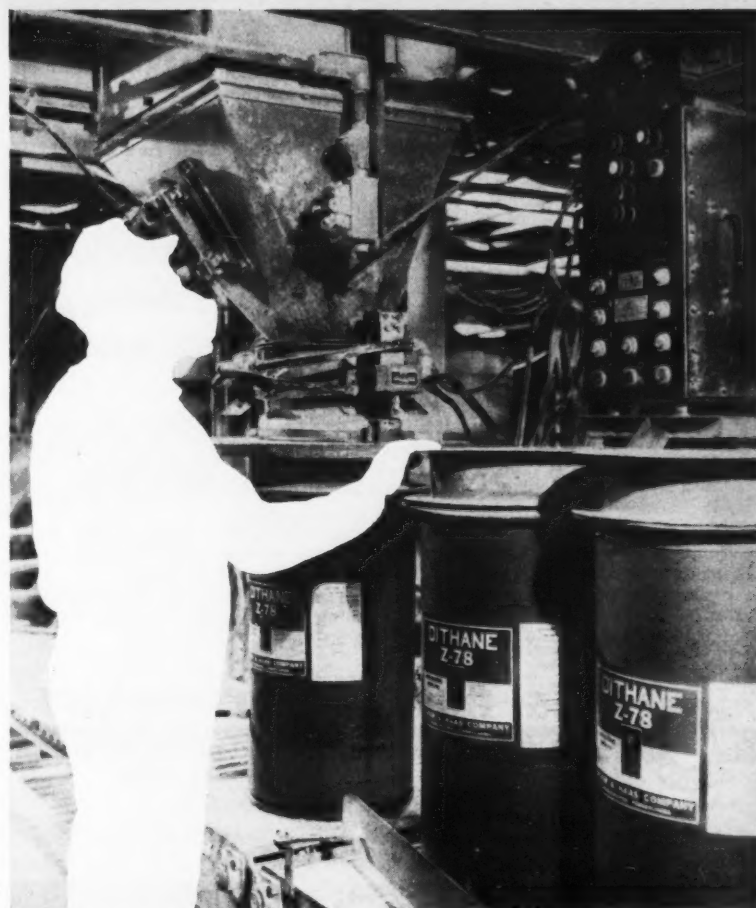
Features: Three controllable orifices permit any desired spray density and control of spray pattern. Same basic design can also be used on foaming products.



Nylon construction of valve makes it compatible with most pressurized products

Description: Sealing and retaining ring holds pressure button firmly on stem, eliminating possibility of lost buttons and preventing seepage between stem and button. Manufacturer offers lab and research facilities to prospective valve users.

(Nylon valve is product of Seaquist Manufacturing Corp., Dept. CP, Cary, Illinois. Check 1204 on form opposite last page.)



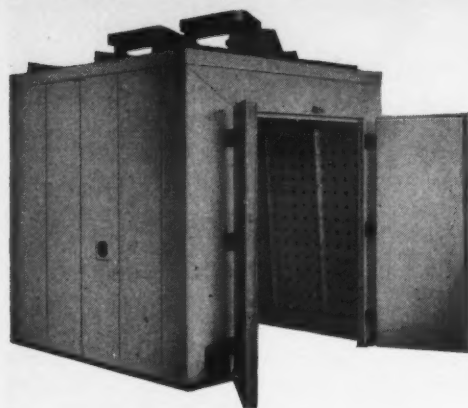
## THAYER SCALE aids safe packaging of powdered chemicals

Personnel are protected by using this fully automatic Thayer Scale in packaging powdered chemicals. A warehouseman safely stockpiles empty drums on a conveyor belt where they are automatically spaced, filled to a precise net weight, then conveyed away for covering. Dependability is assured by the THAYER PLATE leverage system which has no knife-edge pivots and is guaranteed accurate for the life of the scale. For information on models handling products which flood, stick or are lumpy please write THAYER SCALE AND ENGINEERING CORP., PEMBROKE, MASS.



**AUTOWEIGHTION**  
BATCHING • FILLING • CHECKWEIGHING • AUTOMATICALLY

When inquiring check 1205 opposite last page



## ROCKWELL OVENS for Drying Chemicals Plastics Process Materials

### Provide Fast Recirculation Heating

Uniform distribution of high velocity, recirculated, heated air in Rockwell Ovens assures faster drying, baking or curing at precise temperature.

Designed for gas, electric or steam heating, they are made in a wide

range of standard cabinet, rack and truck types for batch processing and in special conveyor types.

Investigate the oven with built-in heating "know-how." Write for Catalog.



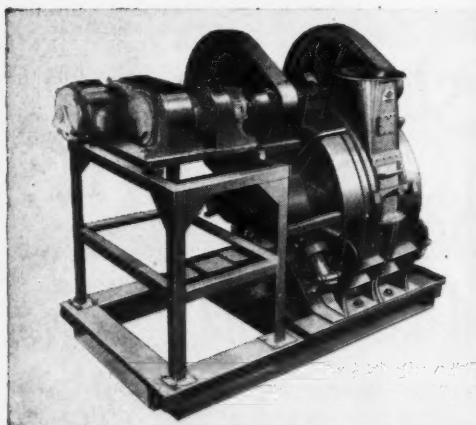
### W. S. ROCKWELL COMPANY

FURNACES • OVENS • BURNERS • VALVES • SPECIAL MACHINERY

2207 ELIOT STREET • FAIRFIELD, CONN.

Sales Representatives in Principal Cities

When inquiring check 1206 opposite last page



**DAVENPORT**  
PRESSING — DRYING  
and  
COOLING Equipment  
Continuous DeWatering  
Presses  
ROTARY DRYERS  
Steam Tube, Hot Air  
and Direct Fire  
Atmospheric  
DRUM DRYERS  
ROTARY COOLERS  
Water and Air

### "DAVENPORT" Variable Speed Continuous DeWatering Press

Efficient drying of many products requires the extraction of excess moisture mechanically. "Davenport" continuous presses extract surplus moisture economically from products having physical properties of a fibrous nature.

The "Davenport" variable speed drive, provides production operation at its highest efficiency.

Let our engineers consult with you on your Pressing, Drying and Cooling problems or send for our catalog C. For quick reference consult your Chemical Engineering Catalog.

**davenport** MACHINE and  
DAVENPORT, IOWA U.S.A. FOUNDRY COMPANY

When inquiring check 1207 opposite last page

### PACKAGING

Cemented side seam  
permits lithography  
on all sides . . .

polyethylene top, with no  
soldering, permits top printing

First oblong or "F" style can to be fitted with polyethylene nozzle, unit is manufactured with a lithographed top. Can is now produced with welded wire handle . . . manufacturer expects to furnish unit with strap handle to be clinched into top seam.



Can is constructed without solder

No solder margin allowance is needed at nozzle opening because nozzle is not soldered to can's top. Metals other than tin plate can be used in manufacturing unit as no soldering is required in any part of the can.

("F" Style Can is manufactured by Continental Can Co., Dept. CP, Continental Can Building, 100 E. 42nd St., New York 17, N. Y. . . or for more information check 1208 on form opposite last page.)

This month's Processing and  
Engineering Data section  
starts on page 204

### PACKAGE CODING

on caps, cans  
and cases



For every package and every production rate, we have developed a proven line of rubber coding type and holder . . . with the proper inks to give you the marking you need.

Write for samples, indicating the equipment you intend to use.

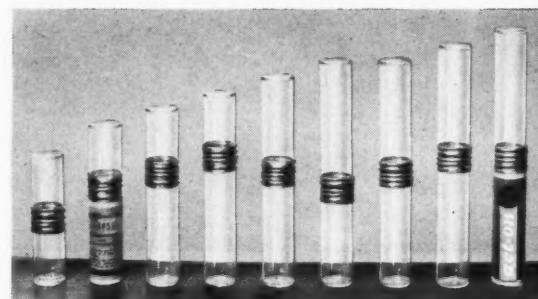
### JAS. H. MATTHEWS & CO.

3934 FORBES STREET PITTSBURGH 13, PA.

CHICAGO • PHILADELPHIA • BOSTON

CLIFTON, N. J. • JACKSONVILLE

When inquiring check 1209 opposite last page



### NEW LERMER PLASTIC COUPL-VIALS COM- BINE SIZE FLEXIBILITY WITH PACKAGING BEAUTY AND UTILITY In Color Combinations

. . . can be used to package one or two  
different or related products in one long container!

LERMER'S new PLASTIC COUPL-VIALS are supplied in threaded cap and body sections joined by an aluminum coupling. Difficult-to-package products are packaged with ease, with beauty and utility. Sizes can be varied to your needs . . . 1" x 4" to 1" x 8" vials are available from stock . . . plus many more sizes on special order. By inserting a separator in the aluminum coupling, one or two different or related products can be packaged in the same vial. Write for complete details.



**LERMER PLASTICS, INC.** 530 South Ave.  
REPRESENTATIVES IN THESE CITIES: Rochester, N. Y.,  
Miami, Cincinnati, Columbus, Cleveland, Chicago, Detroit,  
Minneapolis, Philadelphia, San Francisco, Los Angeles, Toronto.

PIONEERS AND SPECIALISTS IN PLASTIC CONTAINER

When inquiring check 1210 opposite last page

CHEMICAL PROCESSING



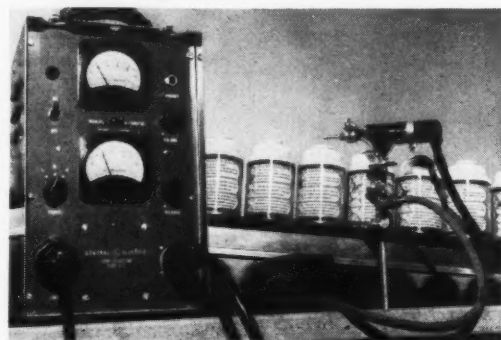
## 'Sniffs out' leaks — is sensitive, fast

Automatically tests for small but costly leaks  
in containers of almost any size

**Uses:** As leak detector on production line basis  
of almost any size container from small "bombs"  
to barrels.

**Features:** Leak detector has rapid response time  
—1/2 inch per second and sensitivity of 1-3 ppm.

**Description:** Detector has a fixed head for  
attachment to conveyor belt of mass-production  
line. Sensitive element is housed in the small fixed

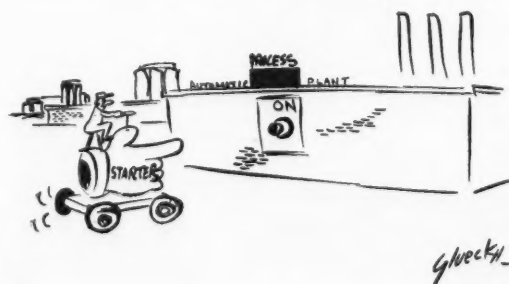


Leak detector "sniffing out" small leaks in containers  
on production line

head and an aspirator pump mounted near fixed  
head provides air-sample flow through element.  
Instrument operates by detection of halogen gas.

Leak defects are indicated visually or audibly—or  
both. Auxiliary equipment activated by signal  
from control box will remove defective units auto-  
matically. Power requirements are 120v AC, 60  
cycles, 85 watts.

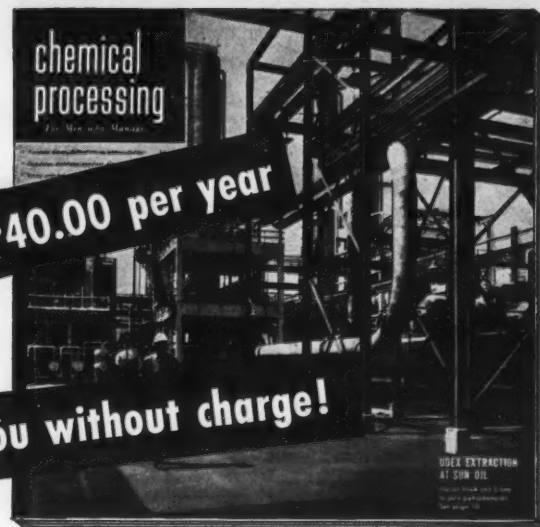
(Type H-1 leak detector is product of General  
Electric Company, Dept. CP, Schenectady 5, New  
York. Check 1211 opposite last page.)



Glueck

This magazine costs more than \$40.00 per year

...yet comes to you without charge!



**Why?** Maybe, like many others, you've wondered  
why **CHEMICAL PROCESSING** comes to you *without  
charge* — while, perhaps, you pay a subscription price  
for other business magazines.

Maybe you've thought publishers *make money*  
when they sell you a \$3.00 or a \$5.00 subscription.

**No—publishers lose money**... yes, most business  
magazines lose money when they sell a subscription  
— not only because the magazine costs more to pro-  
duce than the subscription price brings in — but also  
because the cost of making such sales exceeds the  
income for \$3.00 or \$5.00 subscriptions.

**Advertisers pay the bills** — You see, it's the money  
that comes from advertising that keeps the business  
magazine publisher in business. So, logically, such ad-  
vertisers *demand* best possible coverage of folks like  
you—the important key men who exercise buying  
power.

**So—CHEMICAL PROCESSING "hand-picks" best  
readers**... and sends the magazine to these key  
folks, without charge.

For you simply can't get maximum coverage of  
these important folks by trying to sell subscriptions.  
These men, limited in numbers, are scattered all over

the U.S.A.: travel and/or direct mail cost money; a  
large share "forget to renew" each year; and, no  
matter how much time, money and pressure you put  
on them, there are always some important men who  
will never buy.

**CHEMICAL PROCESSING gets best circulation**  
... So, as you can see, to get the best, most effective  
circulation coverage, the best way is to "hand-pick"  
the right readers, then send the magazine to them.  
This gives value to advertisers which can't be gotten  
in any other way.

**That's why**... **CHEMICAL PROCESSING** "hand-picks"  
only qualified readers... Men Who Manage chemical  
processing plants... presidents, partners, plant man-  
agers, foremen, engineers, chemists, directors of re-  
search, etc. Then the editors make the magazine so  
interesting, so valuable, these folks want to read it.\*

That's why **CHEMICAL PROCESSING** spends many  
thousands of dollars on each issue — to give you this  
valuable service costing more than \$40.00 per year,  
per reader. That's why **CHEMICAL PROCESSING** comes  
to you without charge—you are an important reader  
in the chemical field.

\*Every issue proves this qualified readership... by unequalled  
response from these key readers. May we show you the evidence?

Chemical Processing

published by Putman Publishing Company

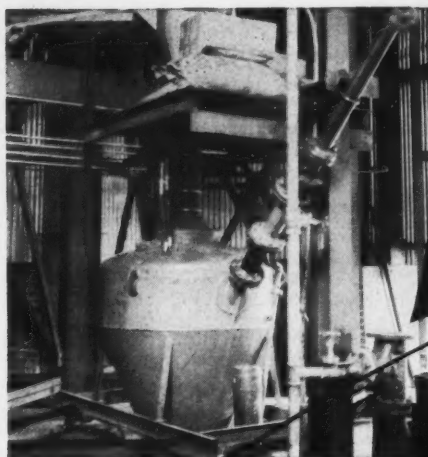


also publishers of:  
**FOOD PROCESSING**  
**FOOD BUSINESS**  
**INDUSTRY POWER**  
"Executive Magazines for Industry"

# Robinson

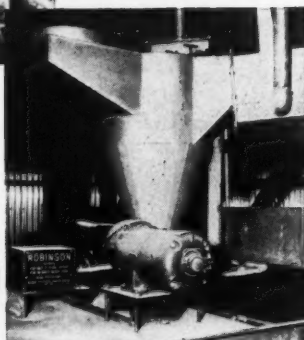
*Air-Activated*

## Conveyor System



One Highlight  
of this  
**LYNCHBURG  
FOUNDRY**  
Installation

Remarkably Accurate  
Batches of Sand  
Automatically Weighed  
and Transported



By "remarkable accuracy" we mean within 1 to 3 pounds in 1,000 . . . an accuracy made possible by the System's use of the Baldwin Electronic

Load Cell weighing unit, which can be set for any demand batch in weights up to 2500 pounds.

Actually, there are two Robinson Systems at Lynchburg. One, with the Activator Unit located under the hopper-car unloading station, conveys Pennsylvania Glass Sand (120 AFS) to the storage bins. The second unit weighs and loads sand automatically from these bins on demand and transports the weighed batch to the muller line. It takes about 1 minute to weigh and transport one batch. Air consumption is less than  $\frac{1}{3}$  cubic foot of free air per pound of sand conveyed.

Why not send us an outline of your proposed or existing sand and binder handling requirements and let's see what the Robinson System can offer? If you purchase a Robinson System, you will be doing what Ford-Dearborn, Ford of Canada, U.S. Steel (Edgar Thompson Works) and others have done to their advantage.

**ROBINSON**

*Air Activated*

A Division of  
Morse Boulger Destructor Co.

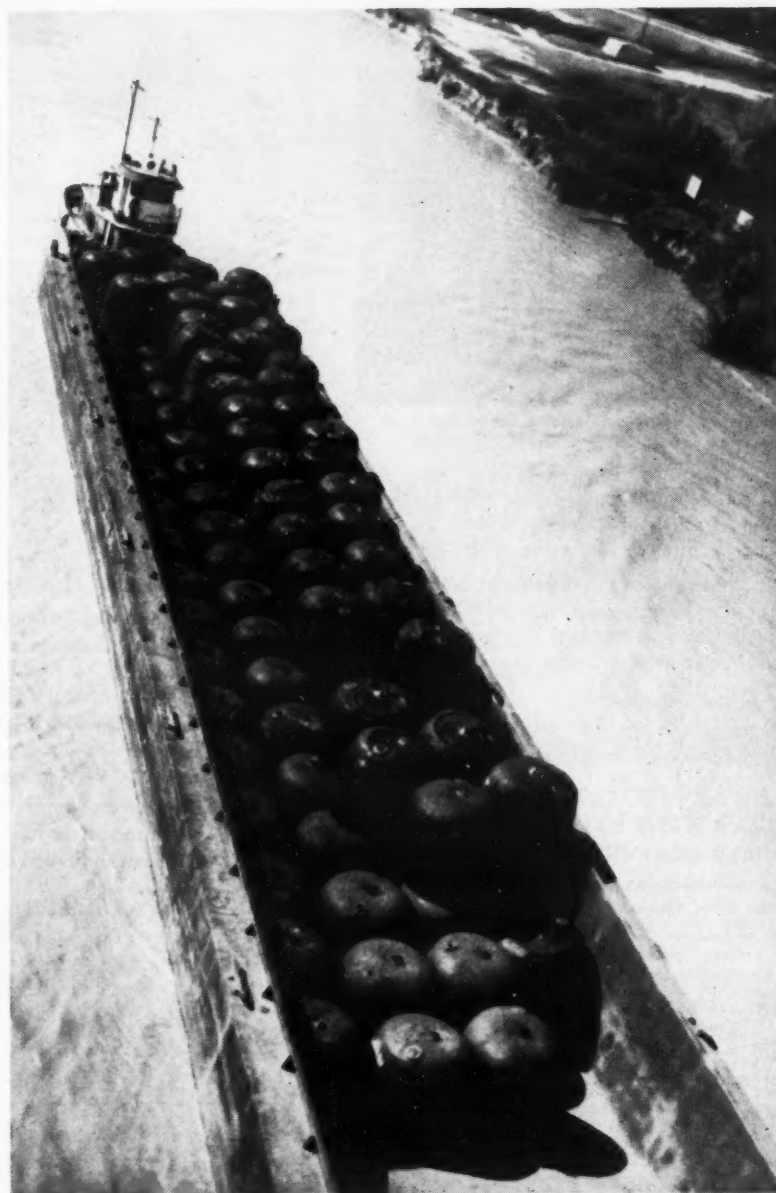
**CONVEYOR SYSTEMS**

DEPT. 801 FIFTH AVENUE • NEW YORK 11, N. Y.  
Representatives in Principal Cities

When inquiring check 1212 opposite last page

Both vendors to a large tire plant in Eau Claire, Wis., United Carbon Company and Cabot Company, combine bi-weekly carbon black shipments, send them up the Mississippi by barge using pressurized, 300-cu ft shipping containers, each holding around 9000 lb of material. Results of the scheme . . .

**bulk containers for carbon black mean:**



Barge containing 500 tons of carbon black starts its trip up the Mississippi

CHEMICAL PROCESSING



- **lowered material price**
- **freight savings**
- **reduced in-plant handling**

Instead of making small, individual shipments to a single Wisconsin tire maker, two Southern carbon black manufacturers are making possible large savings by consolidating shipments, shipping up the Mississippi by barge, using large pressurized rubber containers, each holding 9000 lb of material.

Every two weeks a barge load of 300-cu ft containers, filled with carbon black from the Louisiana plants of United Carbon Co. and Cabot Carbon Company, leaves the shipping point and travels by Gulf Intracoastal Waterway, the Mississippi River, and by truck, to a large tire plant in Eau Claire, Wisconsin.

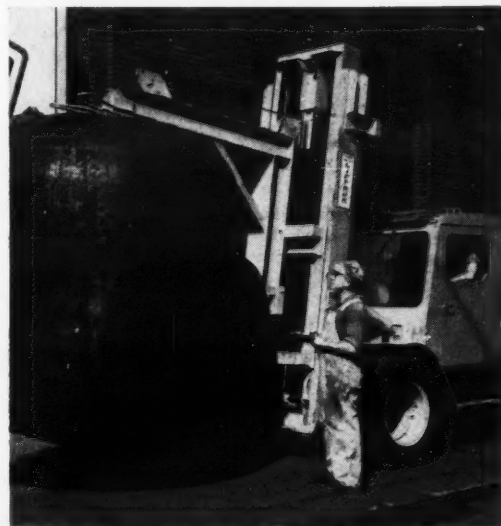
Each container holds an average of 9000 lb of material and replaces as many as 240 paper bags. Savings in packaging by this

bulk method are derived from bulk price, freight savings, reduced in-plant handling costs, reduced product loss, savings of warehouse spaces, and increased cleanliness.

United and Cabot start the shipment at the United Carbon plant at Franklin, Louisiana, and then move down the Gulf Intracoastal Waterway for completion of loading at Cabot's Canal plant near Franklin, Louisiana. Material is also sent by truck from Cabot's Process Tate Cove, Louisiana, plant for loading at Canal.

Gulf Canal Lines take the barge from Franklin to New Orleans. From here the shipment is towed up the Mississippi to Alma, Wisconsin. Open top trucks carry the containers from Alma to Eau Claire. When winter closes navigation on the upper

*(Please turn to next page)*



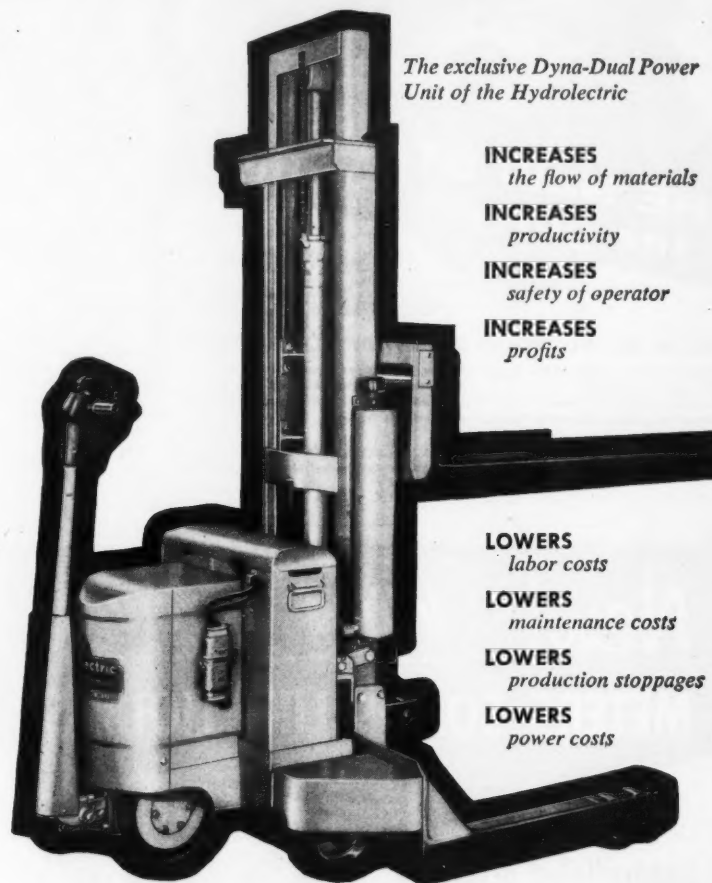
Containers can be handled by lift trucks



Carbon black being fed to Banbury mixers

## MODERNIZE WITH America's most Modern Truck **HydroElectric**

A GREAT NAME IN LIFT TRUCKS



*The exclusive Dyna-Dual Power Unit of the Hydroelectric*

**INCREASES**  
*the flow of materials*

**INCREASES**  
*productivity*

**INCREASES**  
*safety of operator*

**INCREASES**  
*profits*

**LOWERS**  
*labor costs*

**LOWERS**  
*maintenance costs*

**LOWERS**  
*production stoppages*

**LOWERS**  
*power costs*

The only truck with 2 driving wheels and 2 braking systems. In fact Hydroelectric does everything a good lift truck should do.

STUEBING Designed • Engineered • Built



**LIFT TRUCKS, INC.,** / CINCINNATI 14, OHIO



THERE IS A TRUCK FOR EVERY PURPOSE TO HANDLE ANY KIND OF MATERIAL.

When inquiring check 1213 opposite last page



#### 8 NEW VITAL POINTS OF IMPROVEMENT

- New Front End Removable Seals
- Increased Capacity
- Increased Horse Power
- New Hand Wheel Locking Device
- New Quick Disconnect Coupling
- Increased Cooling Surface
- Oversize Radial and Thrust Bearings
- New Base Design

**CHEMICOLLOID LABORATORIES, INC.**  
85 Horriok Road • Garden City Park, L. I.

When inquiring check 1214 opposite last page

• Violent agitation and impact action produces uniform blends of immiscible liquids and stabilizes emulsions.

• Smooth surface shear combined with knife edge cutting action of the Charlotte grooved Rotor and Stator produces complete dispersion of stubborn agglomerates and uniformly fine reduction of solids.

• Clearance between Rotor and Stator remains constant regardless of product flow; no sudden jamming due to sluggish or interrupted supply.

• Mill is fed and discharged under pressure thereby eliminating product aeration.

• New front end gland housing removable for quick maintenance of shaft seal.

• Stainless steel or cast iron construction. Range of sizes from 1 through 125 HP, standard or sanitary construction.

## MATERIAL HANDLING

### Bulk Containers

(Continued from preceding page)

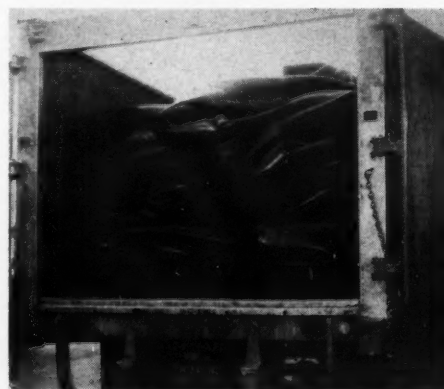


Carbon black containers, each holding about 9000 lb, being unloaded from barge

Mississippi, material is carried by barge to Chicago and by rail from Chicago to Eau Claire.

Collapsible containers are built somewhat like a tire with two or more plies of tire cord and synthetic rubber, molded together in a high pressure vulcanizer to form the outer shell. Additional reinforcing plies of rubber and cord are used in areas where greater stress may occur. A metal lift eye in the center of the top of the container, with several flexible steel cables extending to fittings around the bottom, enables the container to be hoisted and handled after it is filled. With these load-carrying reinforcements within the container and with the container pressurized after filling, very little of the lifting stress is carried by the container wall itself.

Exterior of the container is black neoprene, highly



Collapsed containers can be returned by truck

# EXPENDABLE

## TITAN



## ONE TON CAPACITY PALLETS

- 1 In actual use, save up to \$1, and more, per pallet load shipped.
- 2 Offers full rigid deck strength and economic advantages never before available.
- 3 Loads, secures and handles in every way currently employed with wooden pallets.
- 4 Eliminates return shipping costs, expensive inventory, control and bookkeeping systems.
- 5 Permit converting 75% of ordinarily allocated pallet storage space to more productive use.
- 6 No repair or maintenance.
- 7 End necessity for tying up capital in permanent pallet investment.
- 8 Stack loaded four-high.
- 9 Weigh only four pounds, can be manually handled with ease.

ALSO BULK CONTAINERS, TRAY-TYPE MODELS IN ALL SIZES AND CAPACITIES.

DELIVERIES ARE BEING MADE.  
FOR COMPLETE INFORMATION, WRITE TODAY!

## TITAN

PALLET COMPANY, INCORPORATED  
527 Madison Avenue, New York 22, N. Y.

\*The Keystone of Modern Handling

When inquiring check 1216  
opposite last page.

CHEMICAL PROCESSING

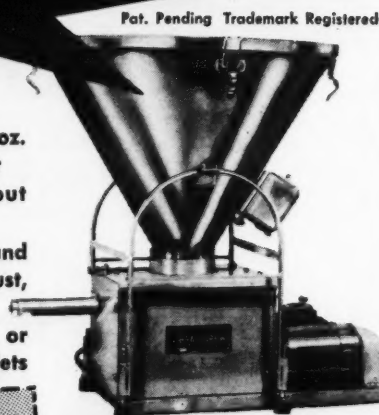
JANUARY

## New! Vibra Screw

### METERS SOLIDS LIKE LIQUIDS

with  
unparalleled accuracy!

- ★ Continuous flow rates from 1 oz. per hour to 100 tons per hour
- ★ Dust-free operation without bridging or flooding
- ★ Accuracy with simplicity and ruggedness—unhindered by dust, dirt or corrosion
- ★ Handles all materials, sticky or free-flowing—powders or pellets



Pat. Pending Trademark Registered

**Vibra Screw**

Low cost Pilot-Laboratory  
model now available!

P. O. BOX 62,  
WILLISTON PARK, N. Y. Write to Dept "C" for latest bulletins

When inquiring check 1215 opposite last page



## MATERIAL HANDLING

resistant to aging, weathering, abrasion, and contact with oils or corrosive material. This construction makes the container practical for outdoor storage and movement.

Filling and emptying closures are gasketed to insure against air leakage after pressurization. Because of a soft flexible rubber sleeve attached to top and bottom closures, foreign contaminants cannot gain entry into the container during filling nor can contents escape during unloading.

Bulk containers are collapsible for return handling. Each week collapsed empties are returned by truck — up to 70 per load — leaving Eau Claire over the week-end and arriving in Louisiana Monday morning for refilling.

(Sealbins are manufactured by Footwear-General Products Division, U. S. Rubber Company, Dept. CP, 1230 Avenue of The Americas, New York 20, N. Y. . . . or for more information check 1217 on form opposite last page.)



### Puts "wheels" on wheels

Traveling at speeds up to 10 mph, compact personnel carrier is designed for intra-plant travel. Useful to plant supervisors, maintenance people or others whose duties require frequent trips over plant area. Runabout is powered by 6-12 volt battery system and gearhead motor. In normal operation, unit travels approximately 25 miles — equal to average one-shift use — before recharging is necessary. Battery change is momentary operation.

Unit has 32-inch wheelbase, 60-inch turning circle and weighs 250 pounds including two 6-volt batteries and built-in charger.

(Personnel carrier is manufactured by Dept. R-200, Kalamazoo Manufacturing Company, Dept. CP, 1827 Reed St., Kalamazoo, Mich. . . . or for more information check 1217A on form opposite last page.)

## For uniform flow of materials, regardless of surges . . .



These three Link-Belt FLEXMOUNT Oscillating Conveyors are installed at a Michigan salt refinery. Each of the two partitioned units handles three grades of salt.

## choose LINK-BELT FLEXMOUNT Oscillating Conveyors

Whether your material is fed in a trickle or in sudden surges . . . a Link-Belt Flexmount Oscillating Conveyor smooths it out into a uniform, continuous flow at selected speeds. Its "Positive Action" is so gentle that a cigarette ash can travel the entire length intact.

Flexmount is compact, flexible . . . ideal for conveying hard-to-handle materials. Leakproof, one-piece troughs can be divided to convey two or more materials simultaneously . . . and can be made dust- and gas-tight. In addition, pre-engineered sections can be bought "off-the-shelf" for low-cost on-the-job assembly. They're available from stock in 8-, 12-, and 18-in. widths from your Link-Belt factory branch store or authorized stock-carrying distributor.

14,208

**LINK-BELT**  
FLEXMOUNT OSCILLATING CONVEYORS

### Only FLEXMOUNT gives you these 8 big advantages

• **POSITIVE ACTION.** Assures smooth, continuous flow regardless of load. Natural spring action minimizes horsepower requirements.

• **COMPACT.** A "natural" for restricted space. Space-saving design permits easy installation.

• **LOW MAINTENANCE.** Operates at low speed. Only the drive needs lubrication.

• **SELF-CLEANING.** No crevices, joints or pockets to cause build-up of material. Prevents contamination.

• **FLEXIBLE.** Various widths, standard lengths up to 100 feet . . . for a few pounds or many tons per hour.

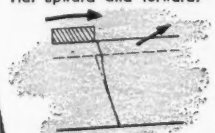
• **LONG LIFE.** Few moving parts. No joints or bearings in contact with material. Resilient legs last indefinitely.

• **SAFE.** Conveying trough has no moving parts. One-piece construction protects product and personnel.

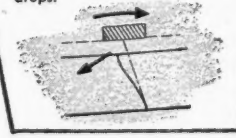
• **VERSATILE.** Handles dry, wet, powder, granular, hot or cold materials and many other forms. Ask for recommendations.

Here's How  
"POSITIVE ACTION"  
moves your  
material

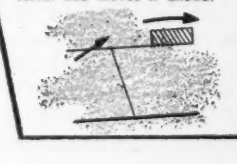
1. Rotation of eccentric drive moves pan and bed of material upward and forward.



2. On downward-backward stroke, pan drops from bed . . . material moves ahead and drops.



3. Ensuing upward-forward movement of pan catches material and moves it ahead.



LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarborough (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

When inquiring check 1218 opposite last page

**Feeds or proportions  
liquid materials . . .**

has memory device to detect any overfeed or underfeed

**Uses:** As liquid feeder and proportioner for handling clear solutions, suspensions, and viscous, toxic, corrosive, or explosive liquids.

**Features:** Feeders incorporate a memory device which detects any overfeed or underfeed condition and corrects it automatically.



Liquid feeder is adaptable for discharge into either pressure or vacuum

**Description:** Feeders operate on dead-weight principle. Units are said to feed many liquid materials with accuracy of  $\pm 1/2\%$  regardless of changes in viscosity, specific gravity, or temperature.

Feeding mechanisms can be varied to job requirements. Feeders are adaptable for discharge into either pressure or vacuum. They can be controlled electronically or pneumatically . . . or paced by pneumatic, electric, or line shaft mechanisms. Feed range of 100 to 1 permits adjustment to meet changes in formulation requirements or increased production loads.

# Better Engineered for



## Shortest Turning Radius

The model HA can work where others can't because it has a shorter turning radius than any comparable tractor-shovel — can go through narrow doorways and between spaces less than 4½ feet wide. With a turning radius of only 6 feet 3½ inches it easily turns corners of 6 foot aisles.



## Higher Dumping Height

This "PAYLOADER" can deliver its loads over bin or hopper edges up to 6½ feet high. The bucket in maximum dump position can clear heights of 5 feet 2½ inches with a forward reach of more than 2 feet beyond front of machine. Loads can be dumped as fast or slow as desired, and at any height.



## Biggest Capacity (18 cu. ft. payload)

With a bucket capacity of 18 cu. ft. payload and 14 cu. ft. struck the model HA has a carrying capacity up to 25% greater than all comparative machines and even more than some bigger, heavier machines. Better engineering including the exclusive 40° bucket tip-back action are the reasons the model HA handles more tons per load and more loads per hour.



## Easiest Operating

The entire hydraulic control of the model HA bucket — tip-back, raise, dump, lower — is handled by a single conveniently located lever. It's the simplest, easiest bucket control available. Smooth hydraulic brakes, full anti-friction steering mechanism and torque-converter drive makes the model HA easy to operate at high output rates the full shift.

Processing and manufacturing plants of all kinds report that the new model "PAYLOADER" tractor-shovels are not only a great improvement over earlier models but are also way ahead of other front-end loaders in design and productivity — can handle more tons of material per hour than heavier machines with larger engines. The exclusive 40 degree break-out and tip-back of the bucket at ground level gets and holds big loads close and low without spilling. Hydraulic

load-shock-absorber smooths the ride and permits higher travel speeds. The low-mounted boom arm design makes operation faster, safer and easier because driver cannot get caught in mechanism and his line of vision is clear. Greater versatility is another valuable feature for many owners who use the floor-sweeper, fork lift, pusher forks and other available attachments that help make the model HA one of the most profitable machines any plant can own.

Owners  
more b  
and are  
bined.  
strate a  
"PAYL





# Unequaled Production



Owners *expect* more from a "PAYLOADER" and they *get* more because more "PAYLOADER" units have been built and are in service than all other wheeled tractor-shovels combined. Your "PAYLOADER" Distributor is ready to demonstrate a model HA, or a larger model from the complete "PAYLOADER" line.



## PAYLOADER®

MANUFACTURED BY  
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.

SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY



**THE FRANK G. HOUGH CO.**  
744 Sunnyside Ave., Libertyville, Ill.

Send data on "PAYLOADER" tractor-shovels

☐ Model HA (18 cu. ft.) and HAH (1 cu. yd.)

☐ Larger models up to 2 1/4 cu. yd.

Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

19

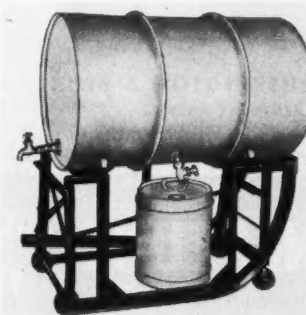
## MATERIAL HANDLING

(Loss-in-Weight liquid feeders are product of Omega Machine Company, Division of B-I-F Industries, Inc., Dept. CP, 345 Harris Ave., Providence 1, R. I. . . . or for more information check check 1219 opposite last page.)

### Positions, transports 55-, 110-gal drums

**Uses:** For transporting as well as for supporting or dispensing 55- and 110-gal drums.

**Features:** Retracting caster frame swings inside rockers while drums are being rocked up and loaded. It is then thrown forward by pressure on foot lever, placing casters well in front of truck.



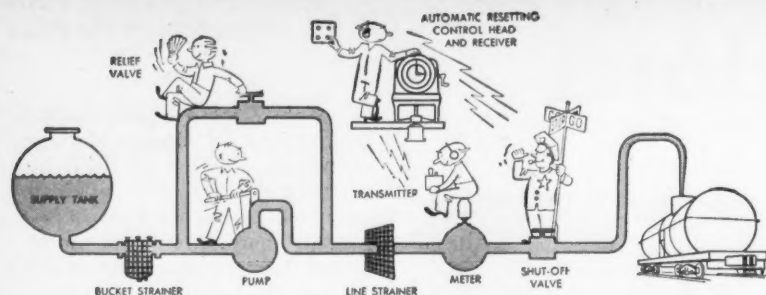
Truck has side opening for dispensing from drums with side bung

**Description:** Safety catch is located on nose piece to prevent drum from slipping while being loaded. Truck has side opening to facilitate emptying drums which have side bung.

Cradle has four 3" diameter wheels supported by cross braces. Four 2 1/2" rollers mounted on top rail position drums. Also available is unit to accommodate 30-gal drum.

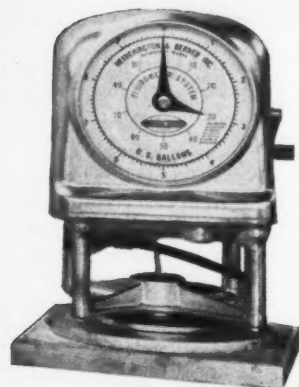
(Morse drum cradle truck No. 55-0 is manufactured by the Morse Manufacturing Company, Inc., Dept. CP, 727 W. Manlius St., East Syracuse, N. Y. Check 1220 on form opposite last page.)

For more information on product at left, specify 1221 . . . see information request blank opposite last page.



## TYPICAL REMOTE CONTROL FLUIDOMETER SYSTEM

For Use Where Valves Must Be Located  
In Hard-to-get-to Places



This animated picture illustrates a typical remote control fluidometer application. Remote control of this general type is recommended when plant conditions or arrangement make direct control impractical or impossible. With a system of this type the fluidometer control head can be located away from the meter. Shown at the left is the automatic resetting control head, which controls the operation of the shut-off valve to give completely automatic batching. Available either jacketed or unjacketed—"tailor made" to fit your needs. New Bulletin FI-56 will be sent on request. For information on jacketed pipe and fittings write for Bulletin J-56.

**HETHERINGTON & BERNER INC. • ENGINEERS-MANUFACTURERS**  
KENTUCKY AVENUE INDIANAPOLIS 7, INDIANA

When inquiring check 1222 opposite last page

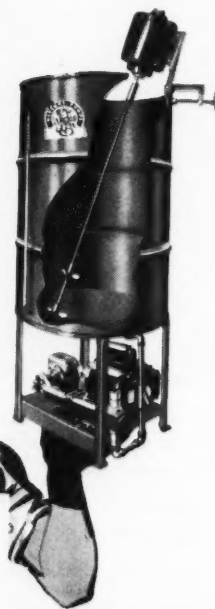
## NEPTUNE CHEMICAL FEED UNIT

**Tank, Agitator and Pump  
as one unit —  
for every chemical requirement**

Do you want all the advantages of a unit that's ready to plug-in, pipe-in and provide finer feed control? That's ideal for boiler feed water treatment in small laundries, dry cleaning, bottling plants, etc.

Then, it's the Neptune Chemical Feed Unit for you... featuring the Neptune series 100 proportioning pump. Readily adaptable for all your needs, where chemical proportioning is a part of your operations.

This is important: it's the perfect combination of low-cost and high-quality. No sacrifice of quality materials, parts or performance.



**NEPTUNE Pumps**

**NEPTUNE PUMP MANUFACTURING CO.**  
4012 NORTH 6th STREET • PHILADELPHIA 20, PA.  
CHEMICAL PROPORTIONING PUMPS AND SUMP PUMPS

Write for free descriptive literature. Details construction data and performance facts. Ask for your copy today.

When inquiring check 1223 opposite last page

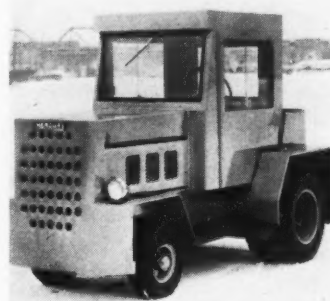
## MATERIAL HANDLING

**Keeps operators warm —  
makes outdoor tractors  
all-weather units...**

tractor cab has hot-water heater and defroster system

Uses: As all-weather cab to be mounted on tractors for outdoor use.

Features: Tractor cab has hot-water heater plus an electric windshield wiper and defroster system.



Despite snow and cold weather,  
operator is warm

Description: Cab was designed specifically for manufacturer's Huskie, models 930 and 940, and model 950 Super-Huskie gasoline tractors. All-steel, 12-gage body can be supplied to customers for mounting. Besides heater, defroster, and windshield wiper, other attachments include headlights, tail lights, and directional turn signals.

(Tractor Cabs are product of Mercury Manufacturing Company, 4044 S. Halsted Street, Chicago 9, Ill. Check 1224 opposite last page.)

**Loading and unloading  
conveyor depicted**

Four-page, two-color bulletin details specifications of two expandable conveyor models. Photographs show conveyors in use.

"Expand-O-Veyor" is issued by The Oliver Corporation, A. B. Farquhar Division, Dept. CP, 110 N. Duke St., York, Pa. Specify 1225 opposite last page.

## NOW! *Hapman* HI-LIFT

### CABLE-VEYOR\* ELEVATORS

offer a new

**LIFT FOR  
YOUR  
PROFITS**

... NEW ECONOMY IN AUTOMATIC  
HANDLING OF BULK MATERIALS ...

Ideal for elevating free-flowing foundry sand, chemicals, foods, metal and plastic powders, gravel, coal, welding flux!

**NEW DESIGN FEATURES CUT COSTS**

Hi-Lift simplicity costs less to buy—less to operate. Far fewer parts than other elevators. No rivets, bolts, fasteners between buckets—long-lived flexible steel cable carries load. No chains!

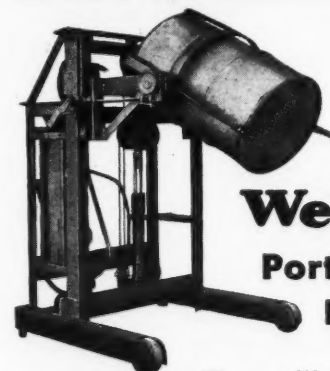
Simple rubber-tired drive eliminates sprockets. Various bucket styles. Three sizes... two speed ranges. Investigate—

WRITE TODAY FOR BULLETIN C-17  
\*Trade Mark Reg.

**Hapman CONVEYORS, INC.**  
DIVISION HAPMAN-DUTTON COMPANY  
KALAMAZOO MICHIGAN  
In British Commonwealth & Europe: Fisher and Ludlow Ltd., Birmingham

When inquiring check 1226 opposite last page

## Simplify, Speed Up DRUM HANDLING



with  
New

**Weld-Bilt  
Portable Drum  
Elevator**

You can lift, transport, store and DUMP all sizes of drums faster, easier, with this new WELD-BILT Portable Drum Elevator. Unique worm-gear tilting mechanism makes "last-drop" dumping safer, more efficient, with minimum effort. Lift, electric-hydraulic operated, is also available for hand operation or fully electrified. Jack-up type steering permits easy, safe positioning.

Write for prices on  
this important time  
and labor-saver.

**WEST BEND EQUIPMENT CORP.**  
MATERIALS HANDLING ENGINEERS

322 Water Street, West Bend, Wisconsin

When inquiring check 1227 opposite last page

CHEMICAL PROCESSING





INC.

A H  
Birmingham

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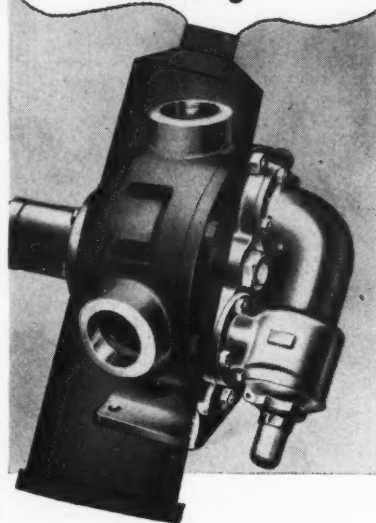
NT CORP.  
ENGINEERS

d, Wisconsin

t page

CESSING

## HOW DO YOU HANDLE IT?



## PUMP IT WITH A VIKING

Here's the answer to your problem of moving semi-solid materials of types usually dispensed in squeeze tubes. With Vikings you can pump such materials as tooth paste, shaving cream, petroleum jelly and many others, in a smooth-even flow. Hundreds of plants are doing it.

Viking's simple, rugged "gear within a gear" principle makes it adaptable to most pumping needs. There are 750 catalogued models and thousands of specially built pumps and units. If you have a pumping problem, call on Viking Pumps for assistance. Ask for bulletin 57Sec.


**VIKING PUMP CO.**

Cedar Falls, Iowa, U.S.A.

In Canada, it's "ROTO-KING" pumps

 SEE OUR CATALOG IN SWEETS  
When inquiring check 1228  
opposite last page

JANUARY 1957

## MATERIAL HANDLING

### Beam bench scale easily moved without disassembly . . .

locking device permits use of beam as convenient carrying handle; no loose weights

**Uses:** Beam bench scales for manual of weighing of packages up to 300 lb.

**Features:** Full-capacity design eliminates necessity of adding and removing loose counter weights. All models can be moved without disassembling; locking device permits use of beam as a convenient carrying handle.

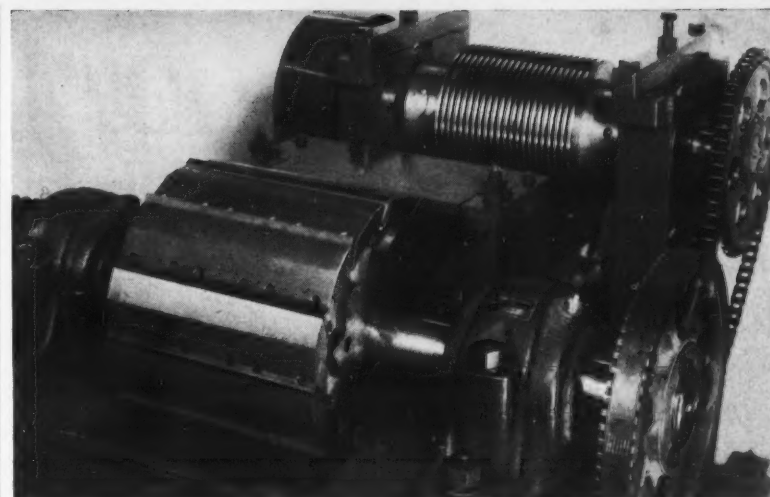
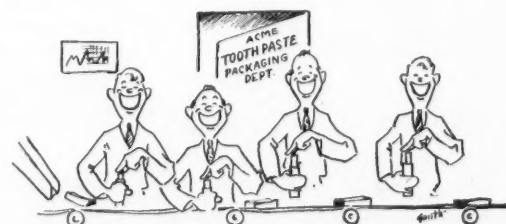
**Description:** All-steel scales are supplied in three basic units of 52-, 105-, and 300-lb capacity.



Position of beam, and sharp, clear weight graduations and numbers make it easier to weigh packages extending over edge of scale platform

ties. The 52-lb model is graduated to  $\frac{1}{4}$  oz; 105- and 300-lb models can be read to the ounce. Platform size of 52- and 105-lb models is  $12\frac{1}{2} \times 16\frac{1}{2}$ "; the 300-lb model has a  $16\frac{1}{4} \times 21\frac{1}{4}$ " platform. Since all operating parts are in front and below scale platform, oversize packages can be weighed without difficulty. Units are available with adjustable tare bars. All models are adaptable to mounting of dial and over-and-under (prepack) indicators.

(Full-capacity beam bench scales are a product of Douglas Homs Company, Dept. CP, 326 Jackson St., San Francisco 11, Calif. . . . or for more information specify 1229 on form opp. last page.)



## CUT UNIFORM PELLETS

from Plastic Sheets or Rods  
with Taylor-Stiles Pelletizers

You can cut plastic pellets of uniform size from sheets or rod stock with Taylor Stiles cutters.

Equipped with circular knives, Taylor Stiles cutters will slit sheet stock into strips and then cross cut the strips into dice. With circular knives removed, Taylor Stiles cutters will pelletize directly from extruded rods. Specially designed slitter knives are available for polyethylene, polystyrene, nylon and other natural and synthetic materials which are fairly hard, and slightly brittle.

Other types of slitter knives are supplied for rubber, sheet cellulose, some vinyl compounds and other materials.

We do not insist on selling a machine made in quantity production. Every manufacturer of plastic compounds must have details changed to meet his special conditions. We cooperate. If noise is important, it is controlled. Size of cuts is whatever is desired. Width, speed, capacity, weight are all made to suit.

Should any difficulty develop, whether our fault or not, we stay with it until it is overcome.

**TAYLOR, STILES & COMPANY**  
20 Bridge Street Riegelsville, New Jersey



Folder #213.

 Packed with facts regarding  
"PELLETIZERS".

Write for your copy today.

Send this coupon for catalog and specifications today.

**Taylor, Stiles & Co.**  
20 Bridge Street  
Riegelsville, N.J.

Gentlemen:

Please send me full details of your plastic pelletizers.

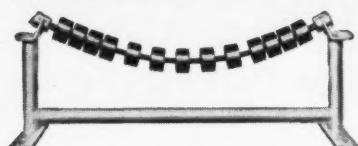
Name .....

Company .....

City ..... State .....

When inquiring check 1230 opposite last page

# Handle Sticky Materials Without Buildup on Rolls!



**UNIQUE BELT CONVEYOR IDLER**  
Flexing action of the Joy Limberoller conveyor idler keeps it free of material buildup . . . keeps maintenance to an unheard-of low.

Belt conveyor maintenance can be a real headache when sticky chemicals and fertilizers start gumming up the idlers. The unique Limberoller belt conveyor idler is completely flexible—made of resilient molded neoprene discs on a flexible steel cable. This flexing action breaks loose any material building up on the rolls—makes maintenance dive 30% to 90%.

The Limberoller has already given over 12 times the service life of conventional idlers in many applications—proved extremely effective in handling triple superphosphate, ammonium sulphate, and sticky fertilizers.

The Joy Limberoller also resists dust, abrasion, and corrosion . . . no bearing trouble because only two bearings are used and these are up out of the dirt zone. Get details from **Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.** In Canada: **Joy Manufacturing Co. (Canada) Limited, Galt, Ontario.**

Write for FREE Bulletin 131-80



For Air and Gas Compressors, Vacuum Pumps and Boosters, Conveyors, Fans, Electrical Connectors, Oil-Free Compressors.

WSW 1-6319-131



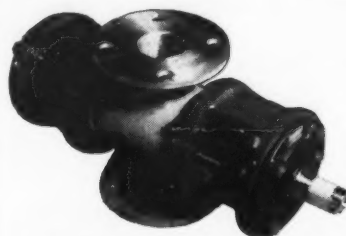
When inquiring check 1231 opposite last page

## MATERIAL HANDLING

**Rotary valve tips made in variety of materials . . .**

can be changed to suit type of product handled

**Uses:** Valve is used as volumetric feeder for controlling feed rate to mixers, blenders, grinders, and weigh-hoppers. Also used as



Rotors can be furnished with flexible tips for handling materials of various types

air-lock feeder at inlet and discharge points of pneumatic conveying system.

**Features:** Rotors can be furnished with flexible tips of nylon, Teflon, or neoprene when handling coarse granular or lumpy materials.

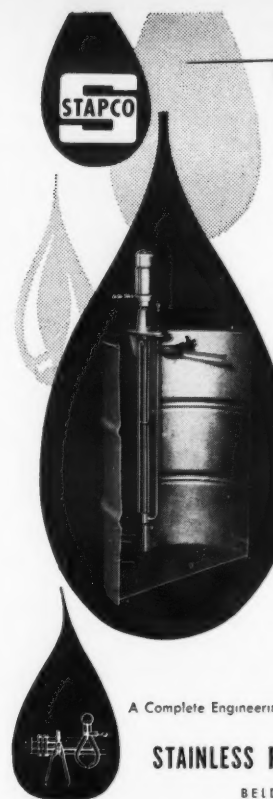
**Description:** Standard feeder valve sizes are from 2 to 16". Volumetric capacities range from 0.0044 to 3.900 cubic foot per revolution. Feeders are furnished with outboard bearings and packing glands.

(Rotary feeder valves are manufactured by The Young Machinery Company, Dept. CP, Muncy, Pa. . . . or for more information check 1232 on form opposite last page.)

**Shows tractor shovels for bulk handling**

Illustrating a wide variety of industrial material handling applications for tractor shovels, bulletin of eight pages gives specifications on full line of manufacturer's shovels.

Form No. 304 is issued by The Frank G. Hough Co., Dept. CP, 744 Seventh St., Libertyville, Ill. Specify 1233 opp. last page.



## IF IT WILL FLOW Will-Flow WILL PUMP IT!

Adhesives, inks, chemicals, foods and drugs of semi-solid or heavy liquid consistency are just a few materials efficiently transferred from one point to another through lines by Will-Flow Systems.

Pumped directly from drum-sized containers, materials are fully protected from contamination by Will-Flow. All parts in contact with the product are constructed of 18-8 stainless steel or similar materials. Models available to handle various capacities.

Will-Flow is fully automatic in operation and delivers materials to points of use at uniform pressures without spillage, wastage, or loss through evaporation. Improves plant housekeeping conditions and lowers material handling costs.

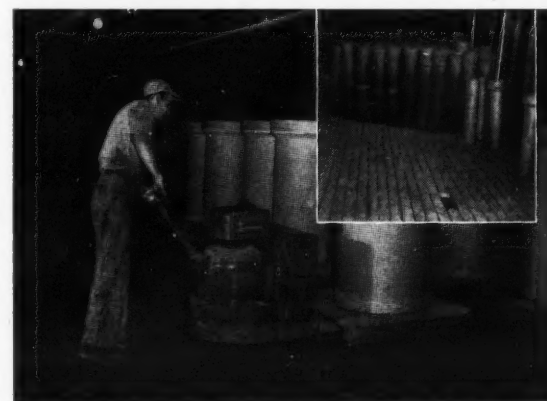
If it will flow, Will-Flow will pump it! Write for full information.

A Complete Engineering Service

**STAINLESS PRODUCTS CORPORATION**

BEELDING, MICHIGAN

When inquiring check 1234 opposite last page



## SAFETY IS FIRST WITH TRI-LOK!

Replace your slippery, rickety old wooden floors with the safest flooring available . . . **Tri-Lok** and **Tri-Forged Grating**. Here are some outstanding features: long life, unusual strength, adaptability, handling ease, minimum weight, maximum openings for light and ventilation. **Tri-Lok** and **Tri-Forged** products meet government specifications, are available in a wide range of panel sizes.



Department D-2101  
**DRAVO**  
CORPORATION  
Pittsburgh 22, Penna.  
National Distributors

When inquiring check 1234A opposite last page

CHEMICAL PROCESSING



## Gives uniform loading from one load point

Hatch cover provides air-tight seal, prevents escape of material

**Uses:** Nozzle is designed to aid rapid pneumatic loading of manufacturer's bulk cars and bins as well as other bulk handling equipment.

**Features:** Swivel nozzle enables loader to get maximum amount of material into vehicle with even distribution. Normally, even distribution required two or three loading points above car hatches or, if only one loading point was used, car had to be moved to position various hatches under it.



Swivel nozzle for loading bulk vehicles can be turned 360 degrees

**Description:** Nozzle consists of bent aluminum tube approximately 2' long and 3" in diameter, fitted into the center of a standard or custom designed aluminum hatch cover. Equipped with a rubber gasket, the hatch cover provides air-tight seal which prevents escape of bulk material being loaded into the transport unit.

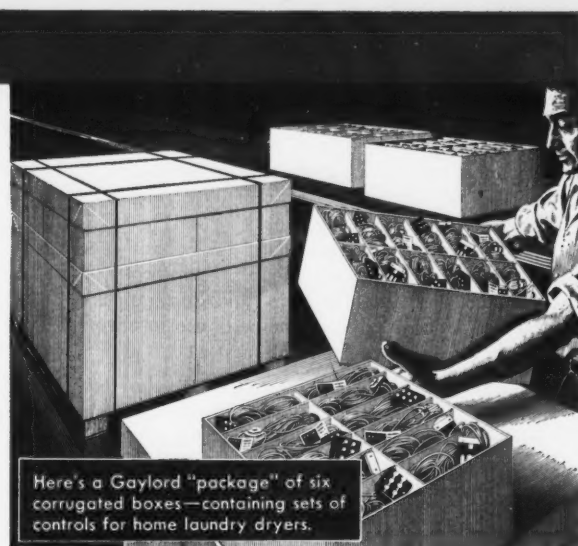
To use, the loading operator first opens hatches on vehicle and fits nozzle into opening. After securing cover to hatch, he aims nozzle at one end of car. This is done by positioning a 4 1/2" handle on the straight section of pipe above hatch cover. Pipe can be turned 360 degrees.

(Loading nozzle is manufactured by the Fuller Company, Dept. CP, Catasauqua, Pa. . . . or for more information check 1235 on form which is located opposite last page.)



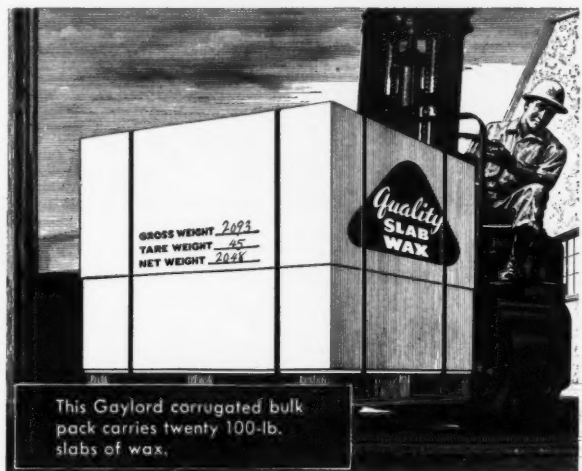
Each of these Gaylord Drumpaks holds 2,000 lbs. of bulk chemicals, replaces twenty 100-lb. units.

... save 20 to 25 manhours per car ...



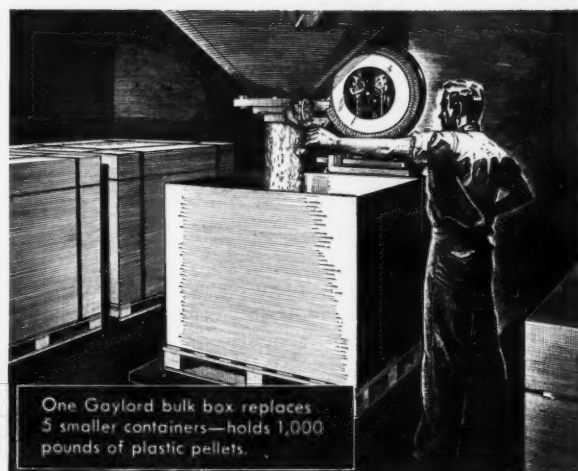
Here's a Gaylord "package" of six corrugated boxes—containing sets of controls for home laundry dryers.

... handling time costs cut 65% ...



This Gaylord corrugated bulk pack carries twenty 100-lb. slabs of wax.

... cuts manhours in weighing and loading ...



One Gaylord bulk box replaces 5 smaller containers—holds 1,000 pounds of plastic pellets.

... save space, save time in palletizing ...

## CUT COSTS WITH CORRUGATED BULK PACKS



*From chemicals to component parts, Gaylord corrugated bulk packs and Drumpaks are saving money, time and handling for shippers. What's your line?*

*Call your nearby Gaylord packaging engineer.*

CORRUGATED AND SOLID FIBRE BOXES • FOLDING CARTONS • KRAFT PAPER AND SPECIALTIES • KRAFT BAGS AND SACKS

**GAYLORD CONTAINER CORPORATION ★ ST. LOUIS**

DIVISION OF CROWN ZELLERBACH CORPORATION

When inquiring check 1236 opposite last page

## MATERIAL HANDLING

### Data on continuous mixer and unloader unit

Equipment for removing ash or other dry material from storage bins, mixing it with water, and discharging it into waiting trucks or rail cars is described in six-page data sheet. Two sizes and four styles of mixer and unloader equipment are illustrated. Six line diagrams and illustrations, with dimensional tables, give pertinent information on size, construction, and design.

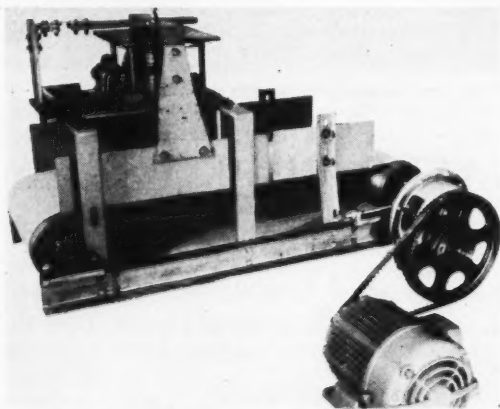
"Data Sheet Uc" is issued by Allen-Sherman-Hoff Company, Dept. CP, 259 E. Lancaster Ave., Wynnewood, Pa. When inquiring specify 1237 on the convenient Reader Service slip which is located opposite last page.

### Uses pneumatic transducer for dependable scaling on conveyor . . .

"packaged" conveyor scale has integral belt conveyor and drive assembly

**Uses:** As "packaged" weighing belt conveyor scale for installation on existing conveyor equipment. Feeding components can be supplied with unit if desired.

**Features:** Weighing belt conveyor scale uses pneumatic weight transducer for dependability; has flexure platform for accuracy despite load placement or pile-up.



"Package" unit has integral belt conveyor and drive assembly. Feed units can be supplied

**Description:** Pneumatic weight transducer utilizes force-balance method of operation. Conveyor scale models can be supplied for material flow ranges of 5 to 30 tons per hour of 100 lb/cu ft material (or equivalent). Performance specifications are: linearity—0.1%, repeatability—one part in 2000, sensitivity—one part in 5000, response speed—63.2% scale in less than one second.



# 36,000 lb Pay

# and the



Shown here is the Model 38M Dempster - Dumpster handling two types of containers. Above a standard 15 cu. yd. bottom dumping container. At left and below a 10 cu. yd. Tilt dumping container in pick-up, haul and dumping positions.



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DEMP



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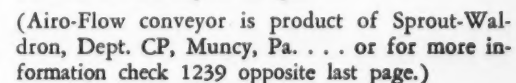
**Our records of hundreds of installations in plants of almost every known classification,**

Can the Dempster-Dumpster System be used profitably in your plant? Let one of our engineers discuss it with you. *Dempster Brothers, Inc. . . . serving all industry throughout the nation.*



SSING

**Description:** Blower consists of dynamically balanced high-speed impellers, driven through guarded V-belt drive by 25 hp motor. Postive air



**NEVER UNDERESTIMATE THE DANGER OF FLAMMABLES!**



## DISASTER! "OPERATION FLAMMABLES"

Why flirt with disaster by using "make-shift" open containers for flammable solvents when fire-safe, protected dispensers are available for every flammable liquid use in all production processes throughout your plant—recommended and approved by Underwriters' Laboratories, Inc. and Associated Factory Mutual Insurance Companies.\*

Far from interfering with production, many of these specially designed fire-preventive containers actually speed production, control ignitable vapors, avoid spillage and save worker time.

Learn more about the approved safety equipment you can use to protect your plant! Check the coupon for the free flammable liquid safety guides you require, or write direct to our Technical Services Department for assistance on special designs and

individual applications.

*Fire Engineering Services.* Protectoseal maintains a national field organization of experienced Safety Engineers qualified to detect flammable liquid hazards in all phases of plant operation and make practical, usable recommendations to eliminate them. A specialized engineering staff is also available to develop fire preventive flammable equipment to meet individual needs.

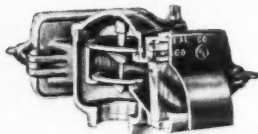
\*Working to prevent fires in cooperation with Underwriters' Laboratories, Inc., Associated Factory Mutual Fire Insurance Companies, National Fire Protection Association, Factory Insurance Association, Improved Risk Mutuals.

**Examples of a Wide Range of Protectoseal Products for Flammables Operations:**



Storage and Dispensing Container

Drum Transfer Pumps



Storage Tank Vents

# PROTECTOSEAL

West Coast Warehouse: Los Angeles, California  
• In Canada: Safety Supply Co., Toronto

THE PROTECTOSEAL COMPANY, Technical Service Department  
1932 South Western Avenue, Chicago 8, Illinois

Please send the following flammable safety guides with Price Lists, and the Safety Bulletin series as checked below:

☐ Safety Can Catalog ☐ Drum Storage and Dispensing Catalog ☐ Vent and Fitting Storage Tank Catalog ☐ Safety Bulletin Series on "Flammable Liquids, their characteristics, hazards and safe handling"

Name \_\_\_\_\_ Title \_\_\_\_\_

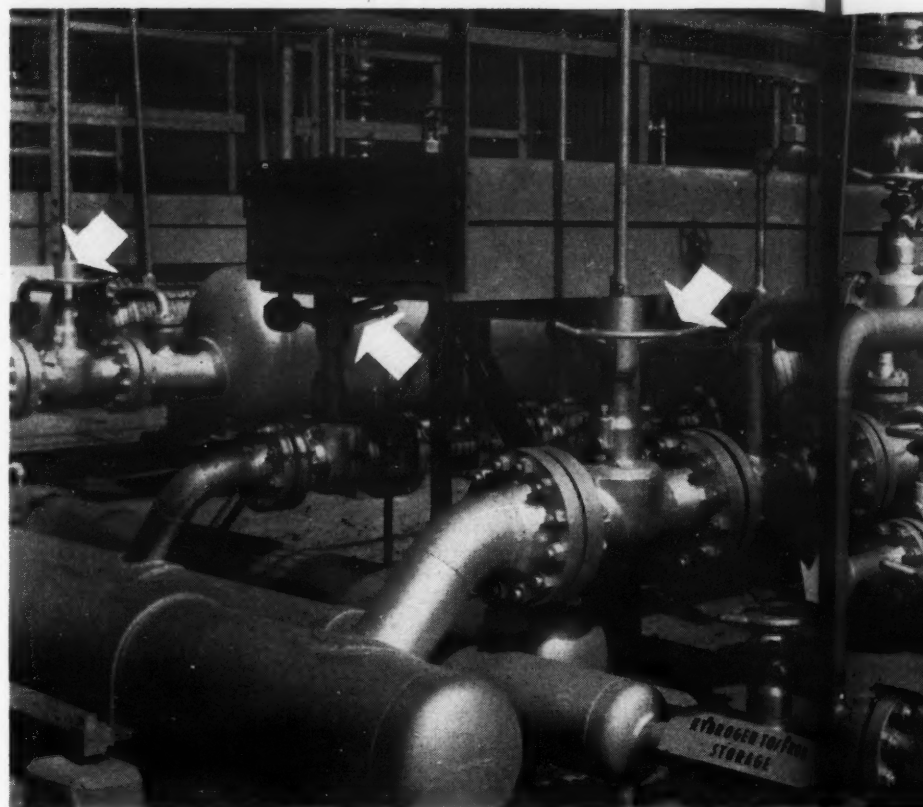
Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

When inquiring check 1240 opposite last page

**safety**



Arrows indicate some of forged steel valves in hydrogen service at Phillips

It's difficult to maintain gas-tight connections when working with light, flammable gas at 400-600 psi . . . Phillips Petroleum successfully uses integral forged steel valves, with a semi-spherical seating core and round-through port, to—

## handle hydrogen gas safely

GORDON WEYERMULLER, Associate Editor

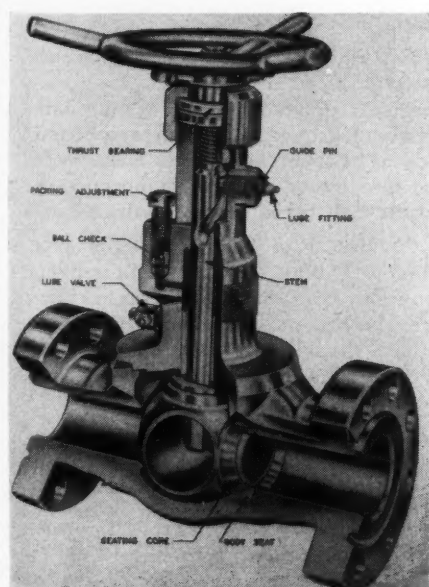
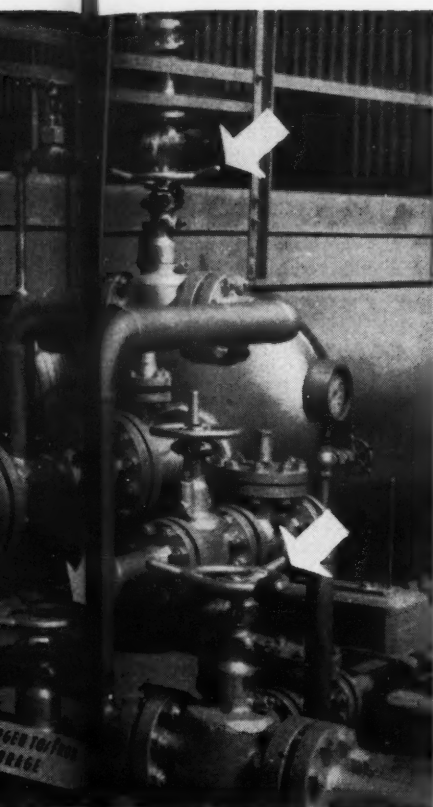
**Problem:** Hydrogen gas — a potentially hazardous material that is light and therefore not easy to retain under pressure — had to be handled in platforming operation that went on stream in Dec. 1954 at Phillips Petroleum Company's plant at Borger, Texas. In the platforming process for producing premium quality fuel, hydrogen gas is produced. A

hydrogen-enriched recycle gas is compressed and returned to the platformer feed. Hydrogen storage system is utilized for maintaining an inexpensive supply of hydrogen for the plant operation.

It is more difficult to maintain gas-tight connections and fittings when working with hydrogen than with other gases such

(Please turn to page 142)





Cutaway illustrates design of valve, which provides positive shutoff and prevents hydrogen leaks



## BIFURCATOR® FAN

**key to your corrosive  
fume removal problems**

BIFURCATOR is the divided-housing fan backed by 30 years experience in design and application.

Ideal for corrosive, high temperature and hazardous fume removal from:

CERAMIC KILNS	FOUNDRIES —
CERAMIC PLANT	SHAKE-OUT AREAS
INSTALLATIONS	FURNACES
CHEMICAL PLANT	GLASS PLANTS
INSTALLATIONS	LITHOGRAPHIC OVENS
CHEMICAL LABORATORY	LUMBER DRYING KILNS
HOODS	METALLURGICAL PLANTS
CORE BAKING OVENS	METAL PICKLING VATS
DRYING OVENS	PAPER MILLS
DYE HOUSES	SLASHERS
ELECTROPLATING TANKS	STRIPPING TANKS
FOOD PROCESSING OVENS	TEXTILE MILLS
FOUNDRIES —	
Pouring Areas	

Mail coupon today for free Catalog DB-37-55.

**DeBOTHEZAT FANS DIVISION, Dept. CPD-157**  
American Machine and Metals, Inc.  
East Moline, Illinois

- ☐ Send Bulletin DB-37-55 containing complete data on the Bifurcator for exhausting fumes.
- ☐ Have a DeBothezat representative call.

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

ATTENTION MR. \_\_\_\_\_

**De Bothezat FANS**  
A DIVISION OF  
**American Machine and Metals, Inc.**  
EAST MOLINE, ILLINOIS

When inquiring check 1241 opposite last page





## SAFETY

**For combined hazards —  
mask knocks out dust  
and toxic fumes . . .**

gives protection against all nonvolatile particles  
plus specific protection against vapors

**Uses:** As respirator masks for protection against  
inhalation of all nonvolatile airborne particles of  
matter as dusts, sprays, mists, and fumes.

**Features:** Respirators also protect against spe-  
cific volatile dusts, sprays, mists, and fumes — as  
organic vapors, acid gases, ammonia and alkali  
gases, organic and acid gases.

**Description:** Filter-adsorbent elements used in  
respirators are in form of cartridges. Elements fit



Filter cartridges for combined hazards fit face pieces,  
are quickly changed

regular face pieces of manufacturer. All four  
respirators protect against inhalation of all non-  
volatile matter. In addition, one model gives pro-  
tection against airborne particles of volatile or-  
ganic substances and organic vapors. Second model  
protects against acid gases or particles that decom-  
pose or hydrolyze to evolve acid gases. Third  
model protects against organic vapors, acid gases,  
and particles that produce organic or acid gases.  
Fourth model protects against alkali gases.

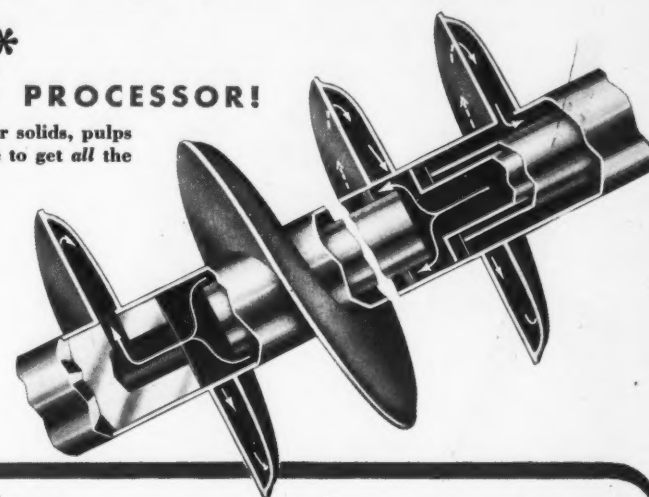
(Respirators Series R5561-R5564 are products of  
Safety Products Division, American Optical Com-  
pany, Dept. CP, Southbridge, Mass. . . . or for  
more information specify 1244 on convenient  
Readers Service slip which is located opposite  
last page.)

if you have a Cooling... Heating... or Drying problem  
investigate the revolutionary advantages of...

## THE holo-flite<sup>\*</sup> PROCESSOR!

If you have processes where slurries, granular solids, pulps  
or pastes are cooled, heated or dried, be sure to get all the  
facts on HOLO-FLITE advantages.

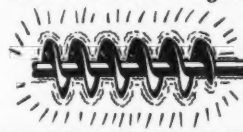
HOLO-FLITE handles such processes — in con-  
tinuous flow — in as little as 1/5th the space  
of other types of heat exchangers. What's  
more, it is readily adaptable to a wide range  
of applications — is simple to install and  
maintain — and provides many other im-  
portant savings.



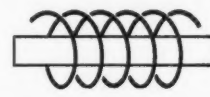
### typical HOLO-FLITE advantages...



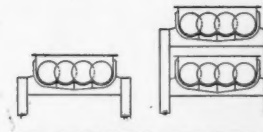
**ITS APPLICATION FLEXIBILITY** is  
almost unlimited. It cools, heats,  
or dries. It handles granular  
solids, pulps, pastes, slurries and  
fluids with equal ease. Its heat  
transfer agent can be water, re-  
frigerant, hot oil, Dowtherm, steam  
or other liquids or vapors at any  
of a wide range of temperatures.  
It cools materials in ranges from  
1800°F to 0°F. It heats and dries  
with hot oil to 600°F... with  
Dowtherm to 750°F... with steam  
to 150 lbs. per sq. in. pressure.



**THE LARGE HEAT-TRANSFER  
SURFACE** saves space — HOLO-  
FLITE requires as little as 1/5th  
the space of other heat-exchange  
equipment of comparable capac-  
ity. Moreover, a more complete  
heat transfer is effected, result-  
ing in more uniform processing.



**ROTATION IS SLOW** — gran-  
ular and powdered solids are  
handled with practically no  
dusting — negligible abrasion.  
There are no dust recovery prob-  
lems — a further saving in in-  
stallation, maintenance and  
operating costs!



**ITS OPERATING CAPACITY** is  
readily adaptable to virtually any  
requirements by simply varying  
the diameter, pitch, and length of  
flights, as well as the number of  
"tiers." Multi-tier units require no  
more floor space than single-tier  
installations!

Send for a Free 8 Page Bulletin which gives further time,  
space and money-saving details on Holo-Flite installation  
and operating advantages!



\*T.M. Reg. (HOLO-FLITE)



### HOW HOLO-FLITE WORKS...

Basically the HOLO-FLITE consists of one or more flights of hollow-  
bladed screw conveyors. The product to be processed moves through  
a trough housing the conveyor screws. The heat-transfer fluid circulates  
through the hollow blades and shafts of the conveyor. The prod-  
uct is constantly rotated into, around, under and over the blades and  
shafts through which the heat-transfer fluid is circulating, assuring  
quick, uniform heat passage between the two mediums — as the prod-  
uct is continuously moved along in a bulk-flow without interruptions!

There are many money and time-saving applications for the Holo-Flite wherever  
products are cooled, dried, heated or even calcined. Let our engineers study your  
particular problem and make helpful recommendations. No obligation, of course!

GET THE COMPLETE FACTS on Holo-Flite savings  
and how this field-proven unit can save space,  
time and money on your processing opera-  
tions. Eight-page descriptive bulletin will glad-  
ly be sent on request. No obligation, of course!

**WESTERN**  
**Precipitation**  
**CORPORATION**

DESIGNERS AND MANUFACTURERS OF EQUIPMENT FOR  
COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

Main Offices: 1023 WEST NINTH STREET, LOS ANGELES 15, CALIFORNIA  
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PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ. BLDG., MONTREAL

When inquiring check 1245 opposite last page

# Ouija boards are passé



Time was, when a person had a question, out would come the ouija board for an answer. This wasn't too accurate a system, of course... but a lot of people put a lot of faith in what the ouija board told them.

Times change — and today accuracy is the keyword. That's why the modern business publication wants its circulation audited.

In joining BPA\* the publisher is taking an important step toward sound and accurate planning in your behalf. It means that he is checking, double-checking and constantly rechecking —

- Who you are
- Where you work
- What your job is

He wants and needs this information — and the BPA\* audit can assure both him and his advertisers that he is getting his magazine into the hands of people *qualified by their common interests* to receive it. It helps him to give you —

- Editorials that will help you in your work
- Advertising that will have value to you

He can serve you even better if you will complete surveys and questionnaires which he may send you and if you will give him your thoughts and opinions on the editorials and advertisements in his magazine.

You, the reader, are the *key person* to the publisher — and the BPA\* audit helps him in his never-ending effort to think about you and design his magazine for you.

You, the reader, benefit when the circulation of a publication is audited by...

**\*BUSINESS PUBLICATIONS  
AUDIT OF CIRCULATION, INC.**  
420 Lexington Avenue New York 17, N. Y.



A Non-Profit, Tripartite Membership Corporation of Advertisers, Advertising Agencies and Business Publications

## SAFETY

### Paging system operates within perimeter of "loop"...

personal receiver is size of cigarette lighter, weighs one ounce

**Uses:** Paging system is designed for areas where loud noises are undesirable or applications where ambient noise would make it difficult to hear conventional paging systems.

**Features:** Unit receives within restrictions of an audio magnetic field set up by wire "loop" around perimeter of an area. Because radio fre-



Personal receiver is useful in applications where noise makes conventional paging system impractical

quencies are not involved, no FCC license is required. Extent of the area to be included in loop is dependent only on power of an associated amplifier and the configuration of the loop. Sound is received through a tiny, flesh-colored earpiece and is inaudible to anyone other than the wearer.

**Description:** Small size is made possible by use of miniature alloy junction transistors instead of vacuum tubes. Unit is powered by mercury storage battery, weighs only an ounce. Transistors, used in the instrument, do not create heat, are extremely rugged, long-lived, light in weight, and require only very small amounts of power.

("Audipage" is product of Government & Industrial Division, Philco Corporation, Dept. CP, Philadelphia, Pa. . . . or for more information check 1246 on the convenient Reader Service slip which is located opposite last page.)



## SAFETY

### Bag holder has safety feature

Pneumatic mechanism applies high pressure at end of clamp's travel to protect hands

**Uses:** Bag holder supports burlap, cotton, paper, or lined bags at filling spout.

**Features:** Pneumatic mechanism that closes bag clamps around filling spout is designed to apply high pressure only during last 1/16" of clamp's travel. In this way all danger of operator's hands being hurt in mechanism is eliminated.



Operator demonstrates safety feature of bag holder. High pressure is applied only during last 1/16" of clamp's travel, preventing mashed fingers

**Description:** Holder is operated by foot valve and air control unit. Foot valve controls opening and closing of holder, leaving operator's hands free to attach and remove bags, thus increasing filling speeds and bagging rates.

System operates on air pressure from 30 to 40 psi and requires two cu ft of free air per minute compressed to 60 psi to perform 60 cycles per minute. Standard holders are equipped with round or oval spouts in sizes to suit bagging requirements.

Small diameter slip-on spout is available for manual filling of small bags, with spout held in place by pneumatic holder.

Grips are rubber lined for seal and grip, and are adjustable to compensate for gradual wear. Holder can be combined with automatic scale on packer operations, so that opening and closing of device is synchronized with weighing and packing.

(Pneumatic bag holder is manufactured by Richardson Scale Company, Dept. CP, Clifton, N. J. Check 1247 opposite last page.)

# NEW RELIANCE P-BASE MOTORS

Designed for outdoor and indoor installations

THESE RELIANCE FEATURES offer you the best motor for your pump installations.

**Totally-Protected, weather tight construction**—Corrosion-proof cast iron housing and sealed conduit box with threaded inlet locks out water, dust and foreign matter.

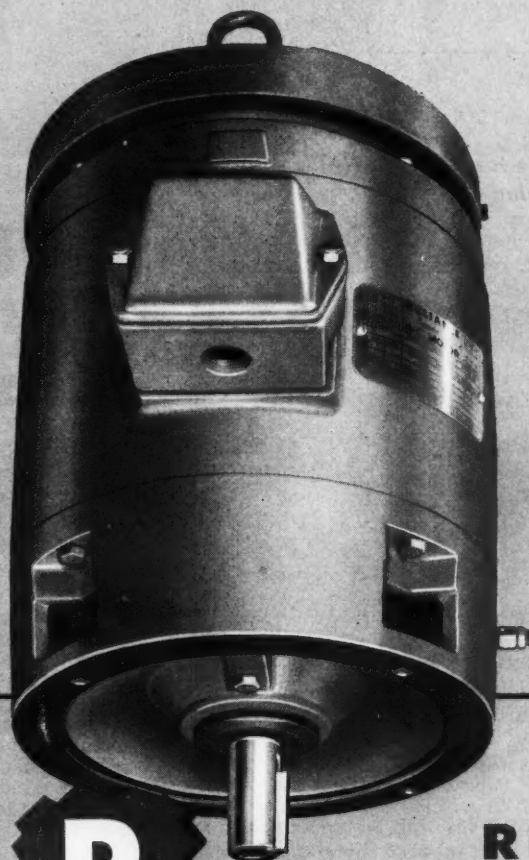
**Perfect pump seating**—True fit machined motor flange mates perfectly with pump flange, eliminating wear from misalignment.

**Life long bearing protection**—Special oversized thrust bearings designed for vertical operation are protected with Metermatic lubrication; you can't grease 'em wrong.

**Shaft sealed**—Neoprene shaft slinger protects windings from foreign matter creeping up the shaft.

**Enclosures for every application**—Protected, totally-enclosed, and explosion-proof, Cl. I Gr. D, Cl. II Grs. E, F, & G enclosures available, 1-30 hp. all electrical characteristics.

B-1130



Totally-Enclosed, Corrosion-Proof



Protected



Explosion-Proof  
Cl. I, Gr. D  
Cl. II, Grs. E, F, & G

Write for bulletin B-2502 and check the facts on why Reliance Totally-Protected P-Base Motors are your best buy.

**RELIANCE ELECTRIC AND ENGINEERING CO.**

Dept. 141 A, Cleveland 10, Ohio • Canadian Division: Welland, Ontario  
Sales Offices and Distributors in Principal Cities

When inquiring check 1248 opposite last page

Only **100% Dynel**  
Guarantees **Maximum**  
Resistance to Acids  
and Caustics—Blended  
fabrics do only  
part of the job!

### 100% DYNEL

- Cuts work clothes costs as much as 93%
- Outwears cotton and wool by 50 to 1
- Durable, comfortable and easy to care for
- Washes easily, dries quickly
- Needs little or no ironing
- Expertly tailored for on the job wear
- Will not support combustion

### LOWEST PRICES EVER



LABORATORY COAT  
STYLE 3895  
GREY—\$10.95 ea.

SHIRT—STYLE 3925  
GREY—\$6.95 ea.  
PANTS—STYLE 3901  
GREY—\$7.95 ea.

COVERALLS  
STYLE 3999  
GREY—\$13.95 ea.

NEW 1957 CATALOG is ready, including pictures and swatches of the latest styles in 100% ORLON and 100% DYNEL and many blended fabrics.

WORKLON, INC., Dept. CP-17  
253 W. 28 St., N.Y., N.Y.

Gentlemen:

Please send me the new Worklon Catalog FREE! ☐

Send me the Dynel work clothes listed below:

Quan.	Style	Size	Price

TOTAL \$

Enclosed find check ☐ M.O. ☐ Send C.O.D. ☐

We pay postage on prepaid orders. Postage charges added on C.O.D. orders.

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ADDRESS

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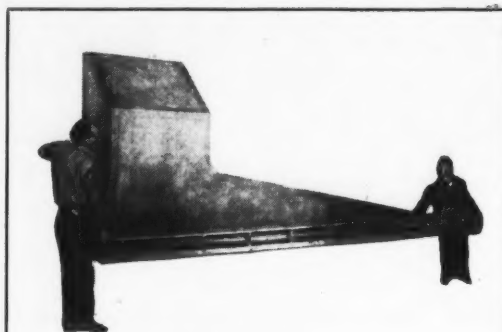
STATE

**WORKLON**

253 W. 28 St., N.Y., N.Y.

When inquiring check 1249  
opposite last page

### SAFETY



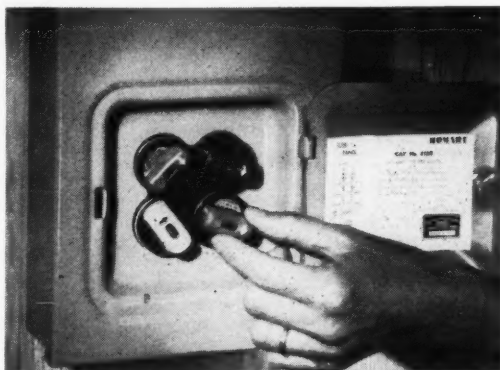
### Corrosion resistant fume hood . . .

. . . 12 1/2 feet long, weighs 178 lb, is stronger and more rigid than metal hood several times its weight. Used to handle strong acid fumes from electric plating operation, unit resists attack by acids, can be easily handled by two men.

(Polyester fume hood is product of Haveg Corporation, Dept. CP, 900 Greenbank Road, Wilmington, Delaware . . . or for more information check 1250 on form opposite last page.)

### Replace six-life fuse without removing . . .

blown fuse located in dark by built-in neon beacon light; renewed by turning safety dial



Replace fuse by switching to new linkage, easy to locate in darkness

Uses: As line fuse with ratings of 15, 20, 25, and 30 amp.

Features: Six-life fuse can be replaced without being removed. Built-in neon light glows when fuse blows.

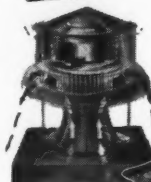
Description: Fuse is screw-in model. Each rating is of a different color to prevent interchanging or replacing with wrong amperage. When a fuse is blown, it is quickly replaced by switching to another fuse linkage.

# SAFE

moisture and fume  
removal

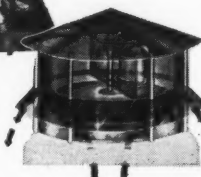


Three outstanding features make Air-Van Power Exhausters especially suited for exhausting moisture and corrosive fumes.



Direct Drive  
150 to 11,000 CFM.  
S.P. to 4"

Belt Drive  
3,000 to  
65,000 CFM.  
S.P. to 4"



- A patented scroll design assures positive air removal. Gallaher Air-Vans are designed to handle up to 65,000 CFM at static pressures to 4".
- The motor is out of the air stream.
- A patented air seal-off protects the motor by creating a constant curtain of fresh air around the motor shaft. This prevents any fumes from entering the motor housing.
- Other Air-Van features include quiet operation, low silhouette, weather-proof design, availability in special metals and finishes and certified ratings based on actual physical tests.

Patents 2188741. 2526290  
Patents pending

## The GALLAHER Company

4108 Dodge Street

Export Office: 306 Paul Bldg., Ulica 2, N.Y. Cable "Keiserquip"

Omaha, Nebraska

When inquiring check 1251 opposite last page

# Regulates Corrosive Gases

This 30" wafer type butterfly valve has a rubber-lined valve body, rubber-covered disc and stainless steel shaft; made for compact installation in line carrying corrosive gases.



This is but one of many W. S. Rockwell standard and special flanged butterfly and wafer butterfly valves that meet any condition of pressure, temperature, corrosion or abrasion. Made in sizes from 4" to 144" of any metal, rubber-covered synthetic resin or glass-coated metal. For regulating, throttling or shut-off of air, gases, liquids or solids, no matter how "tough" the operating conditions. Minimum pressure drop. Non-clogging, self-cleaning. Furnished with any manual or automatic operators. Write for Catalog.

**W. S. ROCKWELL**  
**Butterfly Valves**

W. S. ROCKWELL COMPANY — 2207 Eliot Street, Fairfield, Connecticut

BUTTERFLY VALVES • SLIDE VALVES • AUTOMATIC VALVES

When inquiring check 1252 opposite last page

CHEMICAL PROCESSING



## SAFETY



Each fuse rating is of a different color to prevent replacing with wrong amperage

(Sightmaster fuses are product of A. Lawrence Karp, Dept. CP, 16 Putnam Park, Greenwich, Conn. . . . or for more information about manufacturer's product reader may simply check 1253 opposite last page.)



"He's been asking a lot of questions lately. Don't you think it's time you told him about the protons and the electrons?"

Cartoonist Ken Boyea works at Hercules Powder Co. in Holyoke, Mass.



Painting, courtesy Power Magazine

## New J-M Color Code

### identifies metal in Spirotallic® Gaskets

Most engineers know that Spirotallic Gaskets maintain a perfect seal despite extreme fluctuation in fluid pressure and flange compression. Consequently, these gaskets are used in a wide range of service conditions which include high temperatures, elevated pressures and active corrosives. To withstand these conditions, Spirotallic Gaskets employ a variety of corrosion-resistant alloys.

Because so many of these metals look alike, only expensive tests or costly experience with the gasket could determine the gasket metal used, once its identifying tag was lost. Now the color patch on the centering guide tells the metal employed

and saves time, trouble and expense. This new method of identification also makes it easier for storekeepers and mechanics who handle the gasket. In addition, it simplifies inventories.

Spirotallic Gaskets hold their seal because they are made of spirally wound interlocking plies of asbestos and spring-like metal strip. These gaskets compress easily with light bolting. For catalog PK-35A and copy of color code card write Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ont.



Here are seven of the metals available and their color identifications

Zinc-coated steel—white  
Type 304 Stainless—yellow  
Type 316 Stainless—green  
Type 347 Stainless—blue  
Monel—orange  
Copper—brown  
Aluminum—aluminum



## Johns-Manville SPIROTALLIC GASKETS

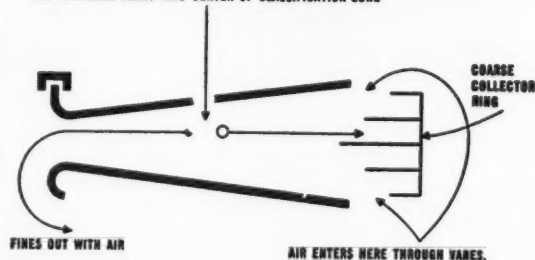
When inquiring check 1254 opposite last page



Classifier operates on air vortex principle. Air enters a centrifugal chamber from outside diameter and follows a spiral or vortex path until it is discharged through an opening nearer center of the chamber. Powder particle will be subject to centrifugal force tending to move it to the chamber wall, this force being opposed by a drag force induced by radial inflow component of air stream.

If particle is large enough, centrifugal force will move it outward, if it is small enough, drag force will move it toward center. When both forces are equal, particle describes a circular path. This equilibrium condition de-

RAW MATERIAL FEEDS INTO CENTER OF CLASSIFICATION ZONE



termines the cutpoint of an ideal classifier. All particles larger than equilibrium size will move to the inside. By directing particles into a suitable collecting system product is readily divided into coarse and fine fractions at a predetermined cutpoint.

Fine powders can now be accurately separated into different particle size fractions, as high-capacity classifier, on a production basis . . .

## SIZES SUB-SIEVE POW

- Eliminates fines or coarse particles or both
- Can process up to 30,000 lb/hr, with over 90 percent separation efficiency

High efficiency in separating dry fine powders into fractions of different particle sizes is afforded by new unit which uses "air vortex" principle of operation (see drawing). In using the classifier, high yields of product are obtained, the exact percentages varying with the density of the product, cutpoint desired, and other characteristics. Product recovery (that portion of the product available in the feed which is separated by the unit) varies from 80 to over 90%, depending upon product requirements. Production runs with talc have produced yields of over 97% at a top size cutpoint of 15 microns.

Particle separation can be handled efficiently in the size range of approximately 10 to 125 microns, and lower than 15 microns on some denser products. Range is dependent upon density of product. Classifier is available in four sizes with capacities ranging from approximately 1000 to 30,000 lb/hr.

In a typical installation, the powder is fed into the classifier from a vibratory feeder. After classification



Classifier is compact and small in relation to its high capacity — up to 30,000 lb/hr



## processing equipment

# EVER POWDERS

the fines fraction is carried by the exhauster air stream to a collector. Coarse fraction goes out through air lock of the classifier, and either returned to the mill for regrinding or collected as product.

Every particle is preconditioned, ready for classification, by being brought up to the air speed before being fed into the classification zone.

Constant cutpoint is maintained by keeping the relationship between centrifugal and drag forces constant. This is achieved by means of converging specially-shaped plates which boost air velocity as the air progresses from outside to inside. This sharp cutpoint is maintained at high capacity regardless of feed rate or size distribution in the feed. For example, fine fractions with a maximum particle size in the range of 15-20 microns will contain less than 0.01-0.04% residue on a 325 mesh screen.

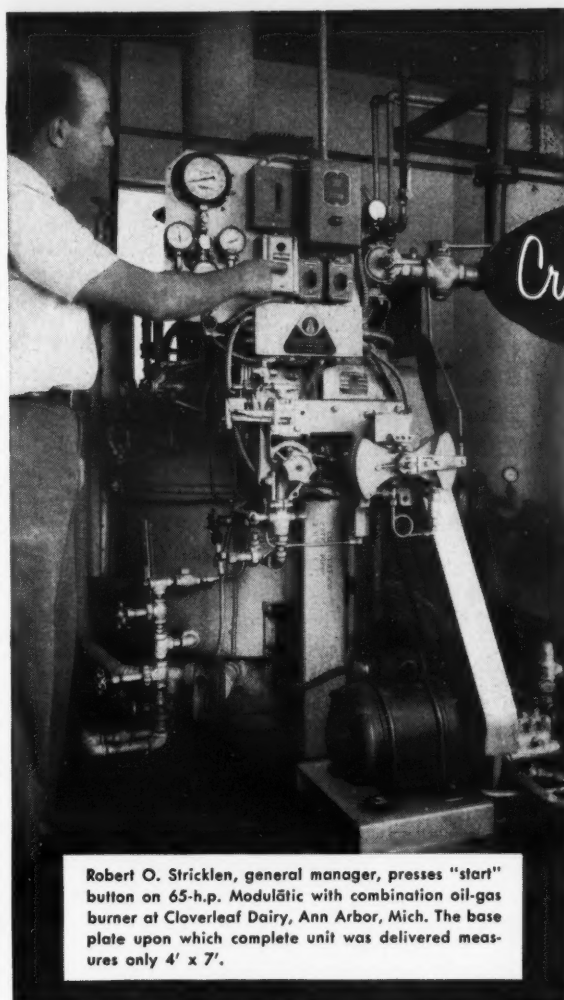
The classifier is compact and small in relation to its high capacity — a unit with a nominal product rating of 10,000 lb/hr occupies no more space than an office desk. Instrumentation consists only of measuring air flow rate and pressure differential across the system. The classifier is adjusted for change in materials and change in cutpoint by changing the air vane to create a new air vortex path, and by adjusting rotor speed and air volume through the classifier.

Unit is self-cleaning; blower suction removes practically all remaining particles during the slow-down

(Please turn to page 151)



To change cutpoint requires only changing of two vane rings and a drive pulley



Robert O. Stricklen, general manager, presses "start" button on 65-h.p. Modulatatic with combination oil-gas burner at Cloverleaf Dairy, Ann Arbor, Mich. The base plate upon which complete unit was delivered measures only 4' x 7'.

Starved for steam?

Cramped for space?

... here's how **Cloverleaf Dairy** solved both of these problems — saved time and money, too!

Like all dairies, Cloverleaf uses a lot of steam for pasteurization, cleanup, sterilizing milk bottles, sanitizing handling equipment and cans. They needed more steam than their old boiler could supply—and they needed more room—but the only possibility for plant expansion was a vacant space which scarcely held an automobile.

What to do? Install a *Modulatatic Steam Generator*, of course! Today, in less than half of this small building-extension, Cloverleaf produces their full steam requirements, and uses the rest of the addition for storage. What's more, you'll now find washing equipment and a new storage tank where the old boiler room and coal bin used to be.

"But just as important," says Mr. Stricklen, "is Modulatatic ability to give us plenty of steam at the constant pressure we want . . . to give us 2-minute steam from cold starts. Now we have no overnight firing, no waiting, no interruptions in production—yet our steam costs are at least 10% lower, without downtime or maintenance except normal servicing."

## MODULATIC STEAM GENERATOR

— world's most compact power-package

### MODULATIC FACTS IN BRIEF

Eight Sizes . . . . . 10 to 160 h.p.  
Pressures . . . . . 2 to 1000 p.s.i.  
Fuel . . . . . Oil, Gas, or Combination Burner  
Floor Area (160 h.p.) . . . . . 5' x 8'  
Height (160 h.p.) . . . . . 6'-10"  
Floor Load (max.) . . . . . 150 lbs./sq. ft.  
Operation . . . . . Automatic  
Number in Use . . . . . Over 13,000

No separate enclosure, expensive stack, or special foundation needed. Multiple-unit installations can have a single, coordinated control.

If you use steam for heating, power, or processing, the self-contained, pushbutton Modulatatic is a development you should surely investigate. It's clean, quiet, follows fluctuating load up or down with unmatched speed and accuracy—just set controls for the pressure you want, Modulatatic does the rest! Why not mail the coupon *right now*?

### VAPOR HEATING CORPORATION

80 E. Jackson Blvd., Chicago 4, Illinois, Dept. 3-A

Please send me free 12-page Modulatatic Booklet No. 586.

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Street \_\_\_\_\_

City, Zone, State \_\_\_\_\_

When inquiring check 1255 opposite last page

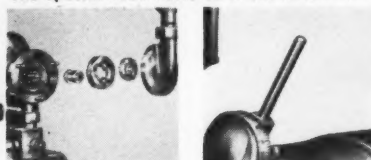


# NEW!

## GAULIN RE\* COLLOID MILL

This is the Model 2A, shown with accessory equipment — stainless steel 3-way valve, bypass tubing and tank — for processing quantities as small as 8 oz.

### The Special PLUS Features of the Gaulin RE\*



Exclusive! Removable rotor, stator and shaft seal can be disassembled without tools. Shaft leakage is eliminated.

Special micrometer adjustment, from .001 to .040, positions gap opening between rotor and stator. Adjustment made when running or not.

**Send for New Bulletin**  
Put this new Colloid Mill to work for you! Complete data on the RE\* line is available in a special bulletin. Ask for C-56 from: The Manton-Gaulin Mfg. Co., Inc., 55 Garden St., Everett 49, Mass.



\*patent applied for  
**MANTON-GAULIN MFG. CO., INC.**  
Everett, Massachusetts

Here's a brand new concept in Colloid Mills — the Gaulin RE\* with removable rotor, stator and shaft seal. The horizontal two-stage design gives maximum capacity per horsepower and unusual processing efficiency.

### Special Materials Available

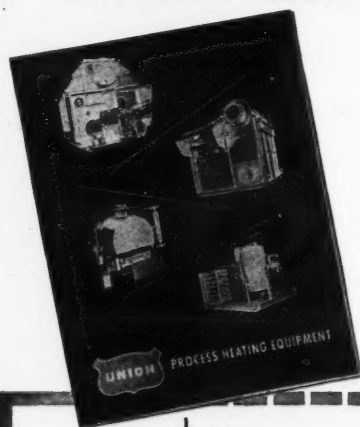
Rotor and stator can be furnished in stainless steel, tungsten carbide, ceramic, aluminum and other special materials. Parts are interchangeable.

### Wide Range of Capacities

The Gaulin RE\* has a capacity range from 0-2600 gph. Model 2A: 0-310 gph; Model 4A: 0-1000 gph; and Model 8A: 0-2,600 — all depending on product, specifications and gap setting.

When inquiring check 1256 opposite last page

## Illustrated Bulletin Presents Newest Designs of Union Process Heating Equipment



Just published, illustrated Bulletin DV presents the full line of Union Process Heating Equipment for use in a tremendous variety of applications: high temperature molding; manufacturing paint, varnish, etc.; processing food products; plating tin; melting solders, asphalt; evaporating high boiling materials; petroleum refining . . . plus numerous others.

Designed for use with Dowtherm "A" and "E", Para-Cymene, Anisole, Aroclor #1248 and Heat Transfer Oil, Union Process Heating Equipment assures accurately controlled temperatures over a broad range at low pressure.

The complete story can be obtained by mailing the attached coupon to Union Iron Works, Erie, Pa.

**UNION IRON WORKS**  
1555 Cascade Street, Erie, Pa.

MAIL your new Process Heating Bulletin DV to us, without obligation.

Name ..... Title .....  
Firm .....  
Street .....  
City ..... Zone ..... State .....

**UNION**

**It's Yours  
For The  
Asking**

When inquiring check 1257 opposite last page

## PROCESSING

**Ultrasonic transducers  
operate at 250 watts,  
155° F maximum**

**Uses:** Unit designed for moderate-scale ultrasonic cleaning and processing operations with ordinary organic solvents, aqueous solutions, mild acids, alkalis, and normal detergents.



Transducer of 1/2-quart capacity  
operates on 22 or 55 kc

**Features:** Standard coaxial connector is provided for V.F. input. Transducers are cooled by forced air.

**Description:** Transducers have rated power of 250 watts and maximum operating temperature of 155°F. They are available in 1/2- and 1-quart sizes with operating frequencies of 22, 55 kc.

(Ultrasonic transducers are product of Gulton Industries, Inc., Dept. CP, 212 Durham Ave., Metuchen, N.J. Check 1258 on form opposite last page.)

### On ribbon mixers

Table of dimensions for different sizes of ribbon mixers, and illustrations showing six different types of agitators are supplied in two-page bulletin.

Bul 300 is issued by The Cincinnati Hildebrand Co., Inc., Dept. CP, 3410-J Beekman St., Cincinnati 23, Ohio. Specify 1259 opp. last page.

## 3 WAYS SPERRY CUSTOM FILTRATION ... HELPS YOU!



**Experience** — SPERRY OFFERS YOU the knowledge gained thru 88 years designing and constructing thousands of filter presses for hundreds of industries.

**Equipment** — SPERRY OFFERS YOU a complete selection of the finest filter presses, standard or special . . . all types and sizes of filter media . . . plus the widest selection of closing devices and other time-savers—for all types of industrial filtration.

**Engineering** — SPERRY OFFERS YOU free consultation. Our laboratory and engineering departments are always at your disposal for information regarding your filtration problems . . . without cost or obligation.

Write for Free 44-page Catalog today

**D. R. SPERRY CO.**  
BATAVIA, ILLINOIS

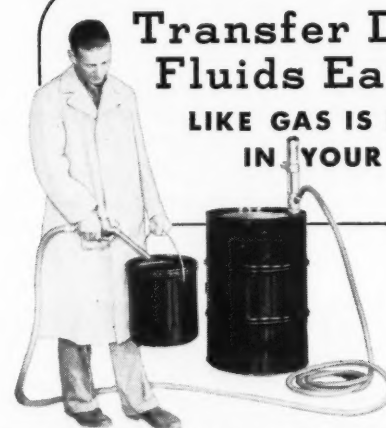
**Sales Representatives:**  
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Yonkers, New York  
B. M. Pilchinsky 833 Merchants Exchange Building  
San Francisco 4, Calif.  
Allred & McCabe 847 E. 17th Ave.  
Denver 18, Colo.  
Texas Chemical Engr. Co. 4101 San Jacinto  
Houston 4, Texas



When inquiring check 1260 opposite last page

## Transfer Drum Fluids Easily

**LIKE GAS IS PUT  
IN YOUR CAR!**



Transfer drum fluids quickly, direct from original 55 gallon drums! It's simple with Graco's lightweight, air-powered Fast-Flo that pumps up to 23 gallons per minute. **Here's how:** Mount the Fast-Flo in the drum, attach a 3/4" hose and gasoline type valve. Open valve at end of hose to start the pump.

Close valve and you stop the pump. One-man operation!

No danger in hazardous locations, no motor burn-outs or sparking. Cuts down on spillage too—helps plant housekeeping. Write for Fast-Flo booklet. See how this lightweight pump solves transferring and dispensing operations.

**GRACO Fast-Flo** "DIRECT-FROM-DRUM" PUMPS

**GRAY COMPANY, INC.** • Engineers and Manufacturers  
12 Graco Square, Minneapolis 13, Minnesota  
FACTORY BRANCHES: New York (Long Island City) • Philadelphia • Detroit  
Chicago • Atlanta • Houston • San Francisco

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When inquiring check 1261 opposite last page

CHEMICAL PROCESSING



**Sizes Sub-sieve Powders***(Continued from page 149)*

to a stop. Places where high velocity exists between powder and contacting walls, such as powder feed tubes, are provided with replaceable inserts for economical maintenance. A high-strength, completely-sealed spindle prevents particles from entering the assembly.

(Super Classifier is manufactured by the Sharples Corp., Dept. CP, 2300 Westmoreland St., Philadelphia 46, Pa. . . . or for more information check 1262 on form opposite last page.)

**Describes glassed-steel columns in tray and packed design**

Eight-page bulletin describes glassed-steel columns for fractionation, stripping, absorption, extraction, chemical reactions and other allied operations. Column design is explained, and tables give pressure ratings and dimensions. Features of tray and packed designs are pointed out. Drawings and photographs show construction details. Information on alloy columns is also included.

Bul 940 is issued by The Pfaudler Co., Dept. CP, 1020 West Ave., Rochester 3, N. Y. When inquiring specify 1262A on form opp. last page.



"May I explain MY process,"

# NOW! FULL AUTOMATION

WITH THE NEW FLETCHER-MATIC CENTRIFUGAL

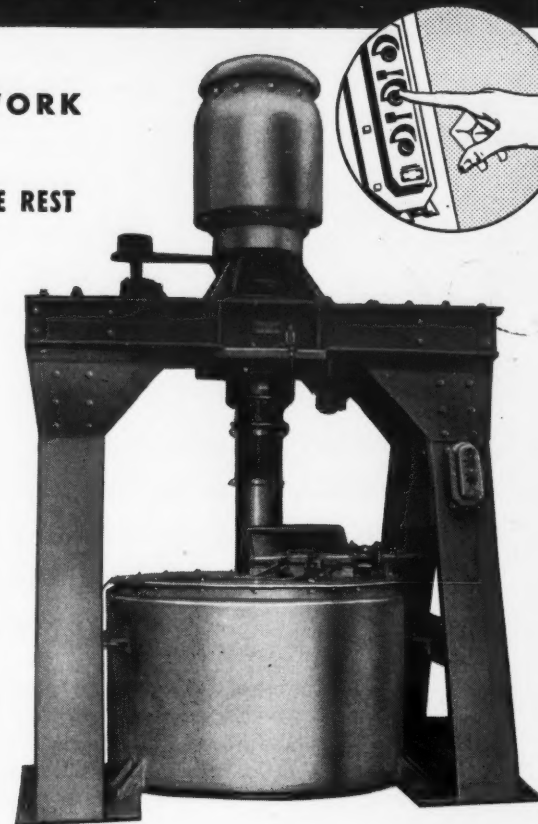
**FOR THE FIRST TIME, COMPLETE AUTOMATION TAKES THE GUESSWORK OUT OF CENTRIFUGATION!**

**SIMPLY PUSH A BUTTON. THE CONTROL DOES THE REST**

AUTOMATICALLY

- ... feeds slurry into the machine
- ... provides indefinite number of washes
- ... puts it through the final drying process
- ... brakes to unloading speed
- ... maintains appropriate UNLOADING SPEED
- ... unloads and cleans the filter media

**Fletcher's Automatic Centrifuge eliminates need of operator (doing away with hazards of human error) and provides uniform timing, complete rate of production and quality control of product.**

**FLETCHER 'ROUND-THE-CLOCK SERVICE**

There's a Fletcher Service Engineer as close as your telephone, on call 24 hours a day, to help you get the most benefits from your Fletcher Centrifugal.

- Size from 20 to 48 inches
- Hydraulic or electric drive
- Cycles can run from seconds to hours
- Unbalanced load knockoff stops machine in event of unbalanced load
- Special fume hood, with observation port and illumination, available for volatile and toxic materials.

**AUTOMATION FOR YOUR PRESENT CENTRIFUGAL** Fletcher can supply the components to make any bottom discharge centrifugal machine fully automatic.

*The New Fletcher Works*

THE FLETCHER WORKS, INCORPORATED

**CENTRIFUGAL DIVISION**

2ND & GLENWOOD AVE.  
PHILADELPHIA 40, PENNA.

I am interested in more information about the Fletcher Fully Automatic Centrifugal.

Name .....

Company ..... Title .....

Street .....

City ..... Zone ..... State .....

When inquiring check 1263 opposite last page

# Announcing

## A COMPLETE PROCESSING EQUIPMENT

### APPLICATION SERVICE

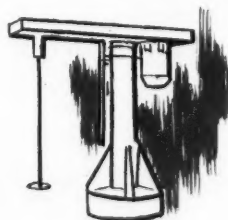
### INCLUDING IN-PLANT TEST OF EQUIPMENT ON YOUR PRODUCTS

The use of this service, we believe, practically guarantees greater plant efficiency with resulting increased profits for all manufacturers whose processes require particle size reduction, dissolving, dispersing, mixing, emulsification, deaerating, homogenizing or related operations involving corrosive and/or non-corrosive liquid-liquid, gas-liquid, or solid-liquid formulas.

Attrition-type Morehouse Mills normally produce up to four times as much as ordinary equipment—even more, depending upon materials involved and end product desired. Cowles Dissolvers with specially designed patented impellers, drives and vessels show comparable performance in their phase of operations.

In many cases the two units may be teamed together to produce literally amazing results. Hundreds of operational reports in our files show production multiplied many times as compared to previous methods, with the additional great advantage of extremely accurate control of particle size and consistency in the finished product.

You are invited to use any or all of the facilities of the *Morehouse-Cowles Processing Equipment Applications Service*. We are sure you will feel well rewarded. Write us on your letterhead about your problem today. There is no obligation.



**Morehouse-Cowles, Inc.**  
1150 San Fernando Road, Los Angeles 65, Calif.



When inquiring check 1264 opposite last page

• Advanced methods of attrition grinding and impeller dispersion have brought surprising improvements in production volume, product quality, cost reduction and space saving. In many fields, adequate information and assistance for engineers and others concerned with designing new plants or modernizing old ones have not always been readily available.

As a result of broad practical experience and exhaustive scientific study, Morehouse-Cowles, Inc. is now pleased to announce a complete nationwide service, proved in practice, that offers manufacturers many important advantages. This plan consists of

1. Survey and consultation on your requirements, without obligation, by a member of our technical staff.
2. Study of end product results desired and materials involved.
3. Competent laboratory assistance, if desired.
4. Equipment application recommendations and engineering for any necessary adaptations.
5. In-plant test to prove results and advantages.
6. A comprehensive report of findings for your consideration.
7. Follow-up service as required, to assure maximum results at minimum cost.

## PROCESSING EQUIPMENT

### Clarifier operates at high pressure, safeguarding following units against damage . . .

unit is placed directly ahead of regular drop-in-pressure dirt removal equipment

**Uses:** Removes foreign matter from diluted paper stock.



High-pressure clarifier safeguards drop-in-pressure dirt removal equipment

**Features:** Clarifier is designed for 60-lb inlet pressure with drop of 10 lb so that discharge pressure is 50 lb—right for delivery to subsequent drop-in-pressure units. Clarifier processes 1500 gpm.

**Description:** Unit operates at high pressure so that it can be placed directly ahead of regular drop-in-pressure dirt removal equipment without pumping stock. This hook-up safeguards units following clarifier against damage and wear, and keeps them in continuous operation. Clarifier can be equipped with either manual or automatic dirt-dumping device.

(Clarifiers, called Centriflors, are manufactured by Bird Machine Co., Dept. CP, Rucaduc Rd., South Walpole, Mass. . . . or for more information check 1265 on form opposite last page.)

### Shows unit for quick cooling of extruded materials

Production-line heat transfer systems for process cooling applications are shown in four-page bulletin. Illustrations depict cooling rolls for close-tolerance, high-speed operations, cooling conveyors for quick cooling of extruded materials, and cooling tunnels designed to meet specific requirements. A summary of engineering services offered by manufacturer is included.

Bul RC-1 is issued by Mayer Refrigerating Engineers, Inc., Dept. CP, Lincoln Park 3, New Jersey. Check 1266 opposite last page.)



# 7

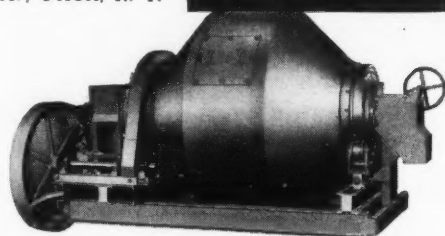
## -WAY ACTION

...for  
better,  
faster  
blending

It lifts... blends... mixes... seven ways, assuring faster, more accurate blending of dry ingredients. Empties completely. Will not grind or reduce particles. Ideal for blending of fertilizers, insecticides, fibrous materials, pharmaceuticals, atomic materials, chemicals, and a wide variety of other ingredients. Can be fitted with internal liquid spray pipe. Gravity intake and discharge with no internal bearings for free-flowing materials.

For details write to:  
**MUNSON MILL MACHINERY CO.**  
Dept. P-157, UTICA, N. Y.

## MUNSON ROTARY BATCH MIXER



When inquiring check 1267 opposite last page

## ON THE SPOT HEAT to your exacting requirements!

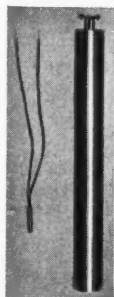


## TRENT STRIP HEATERS

for Ovens, Dryers, Kettles, Process Equipment

- Flat Metallic Tube Casing
- Ceramic Block Terminal Blocks
- No Grooves—No Heat Distortion
- Sealed End Construction

Available in a complete range of types and sizes, wattage requirements, and voltage conditions—for maximum safe surface temperatures of 750°F. and 1000°F!



## TRENT CARTRIDGE HEATERS

for Dies, Molds, Platens, Sealers, Defrosting

- Brass or Steel Sheath Construction
- Nickel Chromium Heater Coil Sealed in Ceramic Insulation
- Silver Soldered End Opposite Terminals
- Brass Angle, Pigtail, Rod, or Stud Type Terminals
- Moisture and Wax Resistant

Standard sizes from 3/8" to 1 1/4" diameter, and 1 1/2" to 22" in length, are supplied in a range of wattage requirements for 110 and 220 volt operation.

Discuss your spot heating requirements with a Trent representative.

Trent Representatives in  
Principal Cities  
Coast to Coast

**TRENT INC.**  
Electrically Heated Industrial Equipment  
242 LEVERINGTON AVE., PHILA. 27, PA.  
In Canada: Supreme Power Supplies Limited Toronto 14

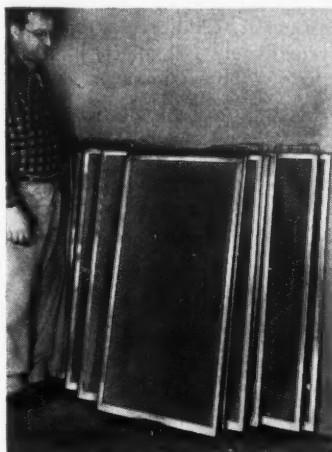
When inquiring check 1268 opposite last page

## PROCESSING

### Lightweight filter leaves are leak-proof, strong

**Uses:** Filtering various materials in vertical and horizontal filters.

**Features:** Leaf's simple design results in lower initial, operating, and recovering costs. Lightweight, rugged construction provides improved support for filter



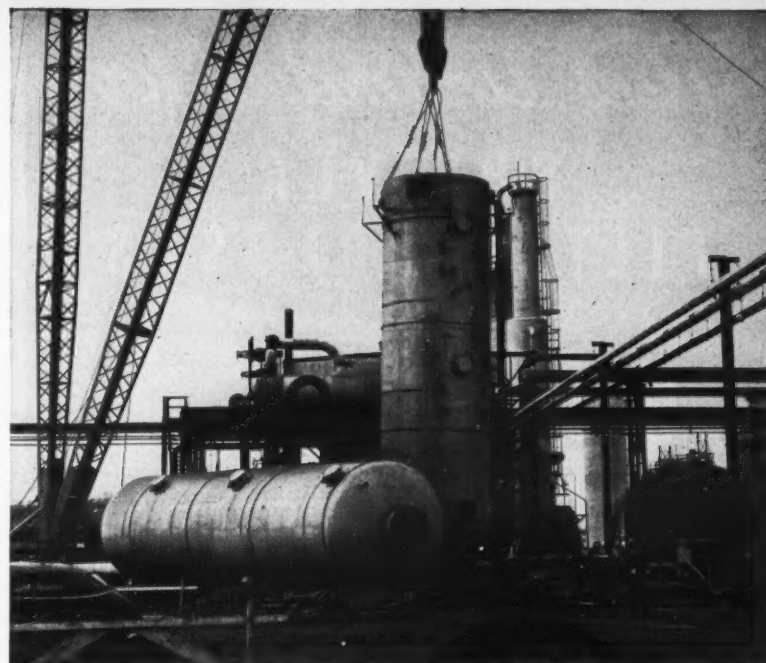
Filter leaf's square corner design results in greater filtering area

cloth covering. Cloth is held in frame by leak-proof mechanical closure, which requires no rivets, bolts, or solder.

**Description:** Frame consists of four thicknesses of heavy-gage sheet metal. The 180° bends of the frame engage 180° bends of cloth to produce a leak-proof seal and hold cloth taut at all points.

The only welding in the assembly is at frame's corners, handles, and outlet. Square-corner design provides greater filtering area. Tapered bottoms are available, if required. Leaves may be made in any commercial alloy and covered with filter cloth of any mesh or weave.

("Rim-lok" leaves are product of Multi-Metal Wire Cloth Co., Inc., Dept. CP, 1850 Garrison Avenue, New York 59, New York. Check 1269 on form opposite last page.)



## More than 86,680 welds in complex column by Downingtown

**Diameter:** 11' 11" I.D.

**Total Height:** 93' 11".

**Material:** Stainless steel, Type 304. Carbon steel skirt and base ring.

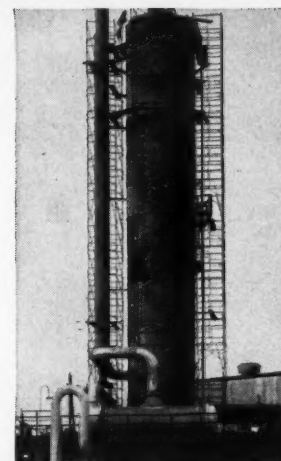
**Shell Thickness:** 1/2" and 3/8".

**40 Trays** and downcomers. 177 bubble caps and risers on each tray.

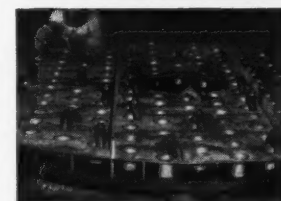
**Code Stamping:** National Board and ASME. Sandblasted and pickle washed.

Downingtown welders completed more than 86,680 separate stainless steel welds during fabrication of this stainless steel column. Tolerances of  $\pm 1/8"$ ...  $\pm 1/16"$ ... even  $\pm 1/32"$ ... were maintained in the shaping, positioning and welding of thousands of stainless steel parts. Lapsed time from drawing board to final field testing: less than six months.

Send for Bulletin PF. It tells the story of Downingtown skill and experience that enable us to breeze through complex fabrication jobs like this one.



Field tested by Downingtown... inspected by customer and Hartford... Code stamped on location.



Special jig for welding stainless steel risers to stainless steel tray.

## Downingtown Iron Works, Inc.

144 Wallace Ave., Downingtown, Pennsylvania

division of **PRESSED STEEL TANK COMPANY** Milwaukee  
Branch offices in principal cities

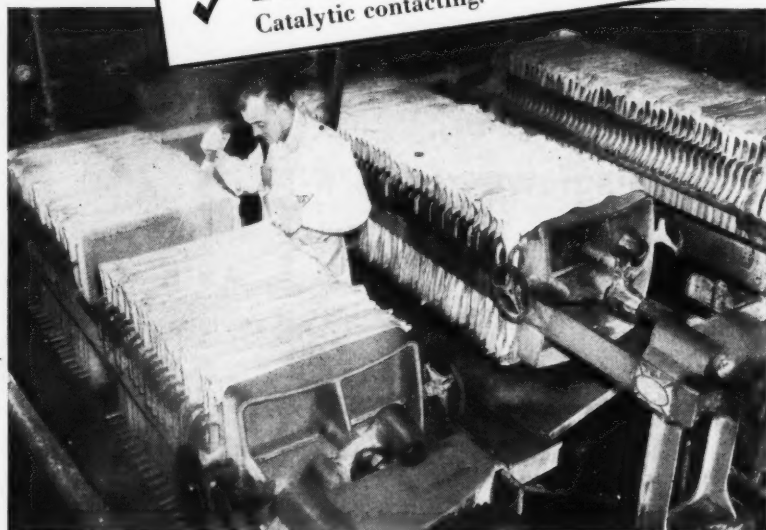
**HEAT EXCHANGERS—STEEL AND ALLOY PLATE FABRICATION**  
**CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS**



When inquiring check 1270 opposite last page

# Uses Unlimited for SHRIVER FILTER PRESSES

- ✓ Complete recovery of solids, reasonably dry.
- ✓ Perfect clarification of liquids, regardless of nature of slurry, even the most viscous materials.
- ✓ Filtration combined with bleaching, decolorizing, deodorizing, germproofing, winterizing.
- ✓ Washing filter cake — Redissolving cake.
- ✓ Extraction—Thickening of slurry.
- ✓ Catalytic contacting.



Because of their versatility, ability to function over the widest range of pressure and temperature, and withstand practically all operating conditions, Shriver Filter Presses are the most extensively used of all batch type pressure filters. They cost less and require less floor space per unit of filtering area.

Write for the Shriver Guide to Better Filtration.

Filter Presses  
Filter Media  
Diaphragm Pumps  
Thickeners  
Slab Formers  
Electrolytic Cells

**T. SHRIVER & COMPANY, Inc.**

846 Hamilton St., Harrison, N. J.

Sales Representatives in

Decatur, Ga.—Houston, Tex.—St. Louis, Mo.—San Francisco—Montreal—Toronto

When inquiring check 1271 opposite last page

## PROCESSING

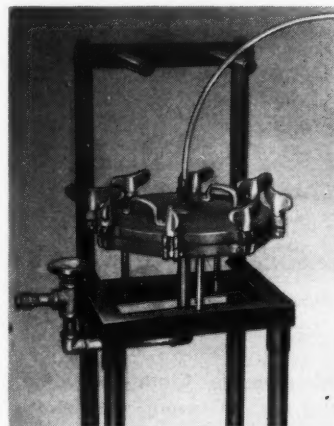
**Can filter out particles down to 0.45 microns suspended in water . . .**

filter element of cellulose ester disc, 150 microns thick

**Uses:** Element provides ultra-fine method of water filtration.

**Features:** Filter is effective in filtering out particles as small as 0.45 microns suspended in water at temperatures under 200°F.

**Description:** Filtering element consists of cellulose ester disc approximately 150 microns thick with total pore volume of 80 to 85 percent. Operating pressure drop across clean filter disc is



Filter element retains all particles larger than 0.45 microns

less than 0.3 psi at flow rate of 100 gallons per hour. Filters are available in capacities of 100 to 400 gallons per hour. Higher capacities are possible when filter plates are arranged in parallel.

("MF Submicron" water filter is product of Barnstead Still & Demineralizer Co., Dept. CP, Lanesville Terrace, Jamaica Plain, Boston 31, Mass. Check 1272 opposite last page.)

This month's Processing & Engineering Data section begins on page 204

*Applied Research*



### to give you better SPRAY NOZZLES

• Shown above is a portion of Spraying Systems' own research facilities. Here the variables of nozzle design, fluid properties and operating conditions are studied and measured . . . to provide original data for better design and improved performance wherever spraying is involved.

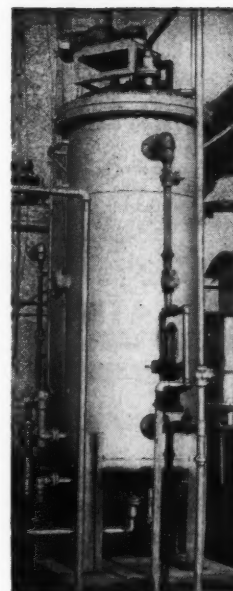
WRITE FOR Catalog 24 . . . contains forty-eight pages of complete information on thousands of nozzle types and capacities.

**SPRAYING SYSTEMS CO.**  
3216 RANDOLPH STREET • BELLWOOD, ILL.

ADVANCED SPRAY NOZZLE DESIGN FOR NEW DIMENSIONS IN CONTROL AND PERFORMANCE

When inquiring check 1273 opposite last page

## Efficient/Practical SOLVENT EXTRACTION AT LOW COST



The York-Scheibel multi-stage extraction column is ideal for simple counter-current extraction; and for fractional liquid extraction in which the feed material is simultaneously contacted by two selective and immiscible solvents.

Check these features . . .

- POSITIVE MIXING
- POSITIVE PHASE SEPARATION
- SINGLE, COMPACT COLUMN
- HIGH THROUGHPUT CAPACITY
- HIGH EFFICIENCY
- LOW STAGE HEIGHT
- LOW COST PER STAGE.

**YORK**

YORK PROCESS EQUIPMENT CORP.

4 Central Avenue  
WEST ORANGE, N. J.

Complete illustrated catalog available describing laboratory, pilot plant and large scale extraction columns.

When inquiring check 1274 opposite last page

CHEMICAL PROCESSING



## PROCESSING EQUIPMENT

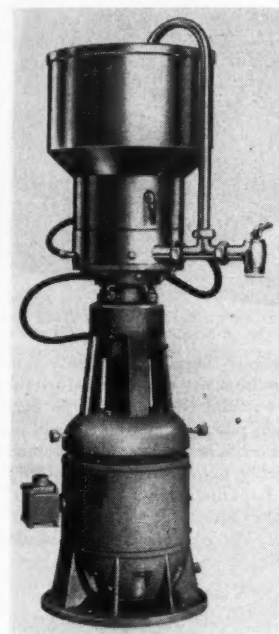
### Mill performs four operations, has one moving part . . .

simplicity of design permits easy repair, cuts downtime

**Uses:** Emulsifying, mixing, homogenizing, and grinding various fluid and semi-fluid substances.

**Features:** Mill performs four distinct blending actions simultaneously, with only one moving part being involved. Simplicity of design minimizes number of parts, permits field repair, and reduces downtime.

**Description:** Mill's only moving part is rotor assembly. In operation, unrefined material is fed into the homogenizing zone, where rotor's upper turbine blades subject material to high velocity whirling action. This breaks slurry into minute globules. Product then passes through adjustable clearances between rotor and stator mechanism. Upper part of this zone contains teeth which subject material to mechanical shearing action. Lower part of area subjects product to hydraulic shearing action.



Colloid mill emulsifies, mixes, homogenizes, and grinds various fluid and semi-fluid materials

Material is given final refining by rotor assembly's discharge turbine. It then passes into outlet

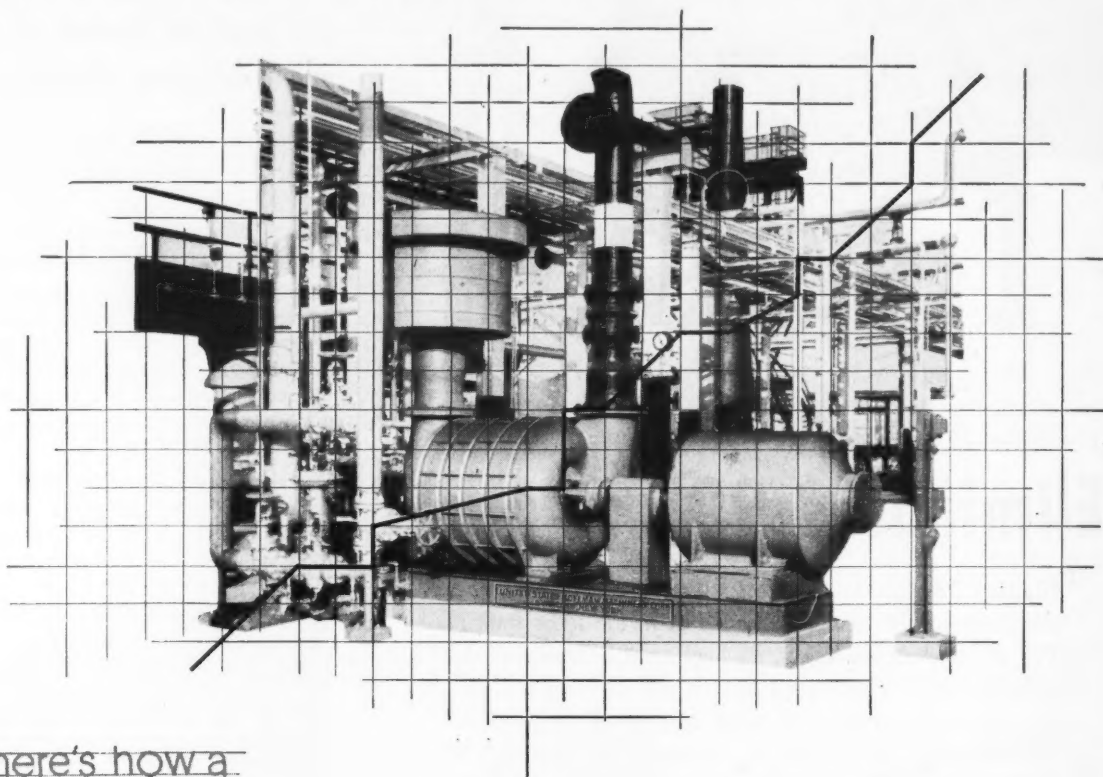
pipe, where it is either drawn off or fed back into feed hopper for additional refining.

Blending action can be controlled by micrometer adjustment device. A calibrated index ring is used to control clearance between rotor and stator. It can be adjusted from 0.0005 to 0.125". Temperature of material being processed can be controlled by means of water jackets surrounding hopper and mixing portions of unit.

Mills are available in various sizes, with capacities ranging from 1/2 to 2000 gph. Contact parts in unit can be made of stainless steel or other materials. Mills are available in direct drive or belt.

(Eppenbach colloid mills are product of Gifford-Wood Company, Dept. CP, Graybar Building, New York 17, New York . . . or for more information check 1275 on form opposite last page.)

## Hoffman engineered systems get results:



here's how a

### HOFFMAN MULTISTAGE CENTRIFUGAL BLOWER

helps recover valuable sulphur from refinery gas

The by-product sulphur recovery system of a leading West Coast refinery required an unfailing, 24-hour-a-day source of process air.

Hoffman engineers, in conjunction with the refinery's consultants and engineering personnel, developed an unusual design to serve as the "heart" of the process.

A Hoffman multistage, centrifugal blower was direct-connected to dual drives with a steam turbine on one end and a 150 h.p. electric motor on the other. In the event of power or steam failure, the load can be automatically transferred from the motor to the turbine. The out-of-doors, all-weather installation thus functions continuously, dependably.

Here is yet another example of how Hoffman air appliance engineers work in conjunction with plant engineers, to design a "custom" installation. Find out how Hoffman engineered systems can get results for you! Write for free bulletin M-133.



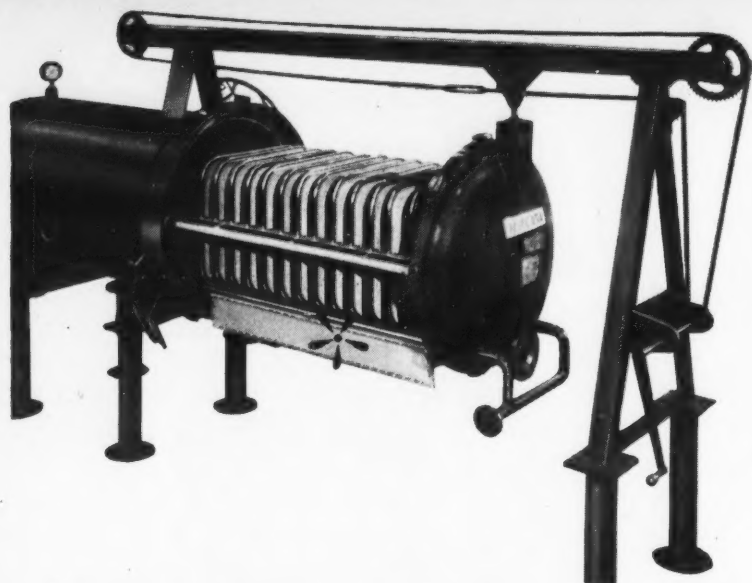
AIR APPLIANCE DIVISION

**U.S. HOFFMAN MACHINERY CORPORATION**

DEPT. C.P., 103 FOURTH AVENUE, NEW YORK 3, N. Y.

**AIR APPLIANCE DIVISION** Multistage Centrifugal Blowers and Exhausters. Pneumatic Conveying Equipment. Industrial Vacuum Cleaning—Portable and Stationary Systems. Continuous Metal Strip Driers. "Smoothflow" Fittings and Tubing. **INDUSTRIAL FILTRATION DIVISION** Machine Tool Coolant Clarifiers—Flotation, Mechanical, and Magnetic. Lubricating and Insulating Oil Conditioners, Filters, and Vaporizers. Solvent Recovery Systems—Vacuum Stills and Filters. **ORDNANCE EQUIPMENT DIVISION** Special Pneumatic Conveying Systems. High Efficiency Centrifugal Separators. Stationary and Portable Vacuum Cleaning Equipment. Process Equipment. Pneumatic Systems for Radioactive Materials.

When inquiring check 1276 opposite last page



## Eliminates 99% of heel

\*Niagara Pressure Leaf Filters with *new scavenger leaves* eliminate unfiltered liquid heel left in the filter tank to 1% or less. Accordingly, no heel need be held for the next cycle. Two scavenger leaves retract from the tank with the leaf carriage . . . swing down into a vertical position for easy cake removal . . . out of the way of cake that drops from the main leaves.

**CUT DOWNTIME**—To remove cake from the main and scavenger leaves, the operator simply shakes or taps them; cake falls into a hopper. For the great majority of applications, the all-metal leaves require no fabric covers. One man can drain, open, clean, fill and precoat *in minutes* . . . not hours. Sharply cutting downtime this way—plus greater flow rates—can easily increase your filtration efficiency as much as 400% over cloth-covered presses.

MAIL COUPON TODAY

# Niagara FILTERS

A DIVISION OF  
**American Machine and Metals, Inc.**  
Dept. CP-157 EAST MOLINE, ILLINOIS

In Europe: Niagara Filters, Europe, Post Box 1109, Amsterdam-C, Holland

☐ Send free Catalog NC-1-53. ☐ Have representative call.

NAME AND TITLE

COMPANY

ADDRESS

CITY

ZONE

STATE

**SPECIALISTS IN LIQUID-SOLIDS SEPARATION**

When inquiring check 1277 opposite last page

## PROCESSING EQUIPMENT

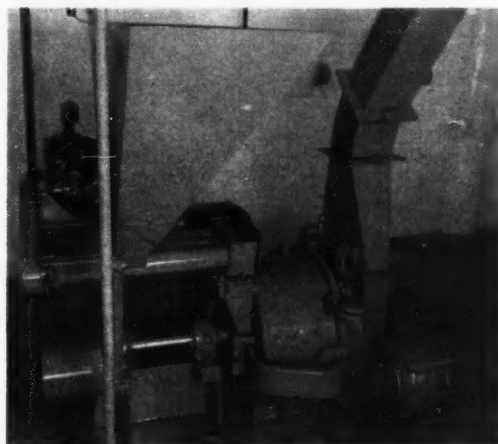
### Pulverizes to sub-sieve particles; has separate control of grinding and classifying chambers

Grinding and classifying rotors operated at differential speeds to obtain highest efficiency

**Uses:** Developed to produce fine particles in sub-sieve range (below 325 mesh and 44 microns).

**Features:** Unit incorporates combination of impact attrition and air attrition. This provides maximum size reduction and minimum wear by material grinding against material. Particle sizes 99 percent less than 5 microns or as coarse as 50 mesh are produced, depending upon material and desired results.

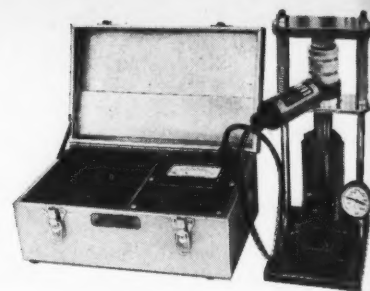
**Description:** Material enters mill from feeder directly into main grinding chamber. High-speed operation of beaters sets up strong centrifugal force, moving material between back grinding ele-



Pulverizer has broad application in grinding of all medium, hard, and soft materials to produce uniform-size fine particles

ment and corrugated back plate. Material then moves to outer area where it is ground between beater tips and liner of chamber wall. As it becomes suitably ground, material is carried radially inward by air stream and passes through holes in grinding plates to classifying chamber.

Through centrifugal force produced by primary and secondary plates which are independently powered by small motor, desired fines are drawn to center of chamber. They then pass through holes in primary and secondary classifying plates and into discharge housing. Large or oversize particles are carried to outer edge of classifying plates where they return to grinding chamber through tailings duct on each side, for additional grinding. Control gates vary air velocity and



### Is improper moisture in your products...

...adding to operating expense?  
☐ yes ☐ no

...slowing production for tests?  
☐ yes ☐ no

...bringing customer complaints?  
☐ yes ☐ no

**Any yesses?** Then it will pay you to find out how the Granular Moisture Register model G5, operating on high frequency power loss principal, will indicate moisture content quickly and dependably, help solve those problems with...**1-minute tests on the spot!**  
• **Practical Accuracy Guaranteed!**  
• **No skilled technicians!** • **Two weeks free trial!**

**Most granular products**  
such as:

Ammonium Nitrate • Ammonium Sulphate  
• Toilet Soaps • Plastic Molding Compound  
• Polyvinyl Chloride • Ammonium Perchlorate • Sodium Bicarbonate • Polyethylene Resins

**DOZENS MORE**

**Moisture Register Instruments**

Moisture Register Co., Dept. CP-5  
P. O. Box 910, Alhambra, Calif.

☐ We are interested in 2 weeks free trial offer. Send additional information regarding Model G5.

We will want to test \_\_\_\_\_

in a moisture range from \_\_\_\_\_ % to \_\_\_\_\_ %.

Firm Name \_\_\_\_\_

By \_\_\_\_\_ Title \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

When inquiring check 1278  
opposite last page

CHEMICAL PROCESSING

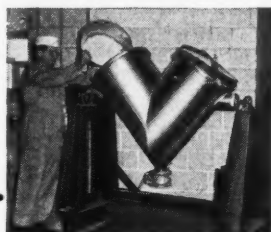


## Exact Scale-Up From Lab Tests in p-k Twin Shell Blenders



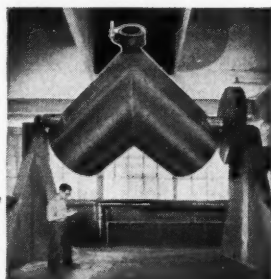
From  
this...

Twin Shell Lab Blenders enable you to carry through hundreds of different blends in the certain knowledge that your laboratory results will be duplicated *exactly* on the job—and in every batch thereafter. Lab models come with Lucite or stainless steel shells in sizes from one pint to 8 quarts. A special yoke attachment, not shown here, holds shells down to 1 pint in size, allows you to run two tests at once.



To  
this...

Twin Shell Production Blenders retain the same exclusive design. Blending of materials is amazingly fast and thorough regardless of varying particle size, shape or density. Yet action is so gentle that delicate crystals in your material will not break down. Charging, discharging and cleaning are particularly easy. There are no internal baffles or obstructions. With these and other advantages, hundreds of users have found that twin-shell units cut normal blending time up to 90%.



...or  
this

Production Models range up to 500 cu. ft. capacity and blend tons of material in each batch. Each retains the same unique 5-way tumbling, rolling and folding action that gives continuous mixing on less power and fewer, slower rotations. And p-k's special high speed intensifier bar (shown in girl's hand, top photo) is available in most sizes to break up lumps and agglomerates and disperse liquids into dry materials.

But this is only part of the story. Let us send you full details—or run some tests, free of charge, blending your materials in a twin-shell blender. Write The Patterson-Kelley Co., Inc., 710 Hanson Street, East Stroudsburg, Pa.

### PATTERSON-KELLEY

Offices: New York, Chicago, Philadelphia, Boston and other principal cities

When inquiring check 1279  
opposite last page

JANUARY 1957

## PROCESSING EQUIPMENT

amount of return through tailings ducts.

Pulverizer is not particularly adaptable to grinding of fibrous materials such as wood pulp, sawdust, alpha cellulose, etc., if extremely fine particles are desired. These materials could be ground to meet a specification of 80 to 100 mesh.

Basic unit is 20" diameter chamber which will take up to 75 hp on grinding side and use 3-hp classifying motor. Other motors required: 1/2 or 1 hp on feeder, 10 hp (max) on exhaust fan of dust collection system.

("Pulvocron" pulverizer is manufactured by The Strong Scott Mfg. Co., Dept. CP, 451 Taft St., N.E., Minneapolis 13, Minn. . . or for more information check 1280 on form opp. last page.)

**Mixes components of foams,  
both rigid or flexible,  
in any proportions . . .**

design of unit allows regulation of components to produce variety of end results

Uses: Mixing components of polyurethane foams to produce either a rigid or flexible end product.

Features: Positive-displacement pumps with variable-speed drives permit exact proportioning of basic components.

Description: Components are placed in separate tanks above top of machine and gravity fed to proportioning pumps. Pumps feed material to mixing head where thorough mixing is accomplished. Machines will soon be offered in various capacities from large production models to small portable units for pattern and development molding. Mixed material may be immediately fed into molds or held in mixer for a time, depending on temperature and formulation.

(Foam machine is a product of Klauder Williams Co., Dept. CP, Adams Ave. & Leiper St., Philadelphia, Pa. . . or for more information check 1281 on form opposite last page.)

**Two vibrating screens heated  
with one transformer**

Equipment for heating two of manufacturer's vibrating screens with single transformer is described in two-page bulletin. Development permits greater production and considerable savings in initial cost and power consumption. Photographs and drawing show details of equipment installation.

Bul 160 is issued by Universal Vibrating Screen Co., Dept. CP, Deane Blvd. and St. Paul R.R., Racine, Wis. Check 1282 opp. last page.

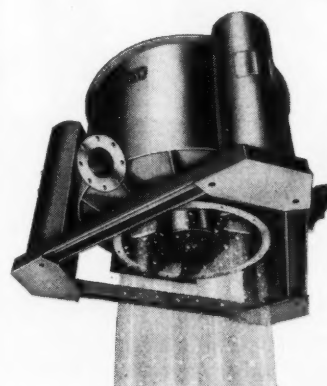
## UNLOADING TIME IN MINUTES

	1	2	3	4	5	10	15
Batch-Master with hydraulic unloader	*						
Other batch centrifugal with manual unloading							

**\*SAVE 14½ MINUTES (or more)  
ON EVERY BATCH**

Batch-Master Centrifugal can discharge solids in 30 seconds! And under identical conditions of cake hardness, etc., a standard batch centrifugal would take 15 minutes or more!

Save time . . . by pushing just one knob. The plow swings out to the side of the basket . . . plows down the basket side . . . travels back and then swings out of the way. Solids meanwhile discharge automatically through the bottom. This new Batch-Master combines quick discharge with the greater stability of Center-Slung Suspension.



**Hydraulic unloader and  
bottom discharge unload  
solids automatically in  
30 seconds.**

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NAME AND TITLE

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When inquiring check 1283 opposite last page

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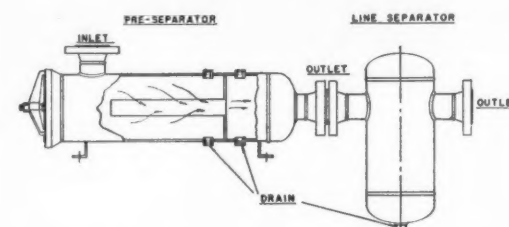
**WELDCO**

When inquiring check 1284 opposite last page

## PROCESSING EQUIPMENT

### **Extremely fine mists separated by unit which employs porous metal tubes**

**Uses:** For removing liquid and solid particles from gas streams in a wide variety of applications. Separator is ideally suited for operating conditions involving pulsation and vibration.



Often, particularly in small flow applications, more effective particle removal can be achieved by using two vessels instead of one

**Features:** Unit can remove very fine mists of 10 microns or less. Oil from compressors can be effectively removed from gases with efficiencies of over 99%.

**Description:** Fine mist is removed by passing it through one or more cylinders made from porous metal. Depending on application, unit is made in a number of different designs, one of which is shown in accompanying illustration. Here two vessels are used, a pre-separator and a separator. Stream passes through porous metal tube as indicated by arrows. Pre-separator acts as strainer as well as to agglomerate mist into large particles which can then be removed by separator.

Units are also available with a number of porous metal tubes. By using multitube construction, it is possible to introduce a large flow area into a small space and keep pressure drop down. Coarseness of porous material can be varied to achieve different pressure drops, flows, and particle removal characteristics. Metal elements are presently available in bronze and stainless steel.

(Multitube separator is product of Peerless Mfg. Co., Dept. CP, PO Box 13165, Dallas 20, Tex. Check 1285 opposite last page.)

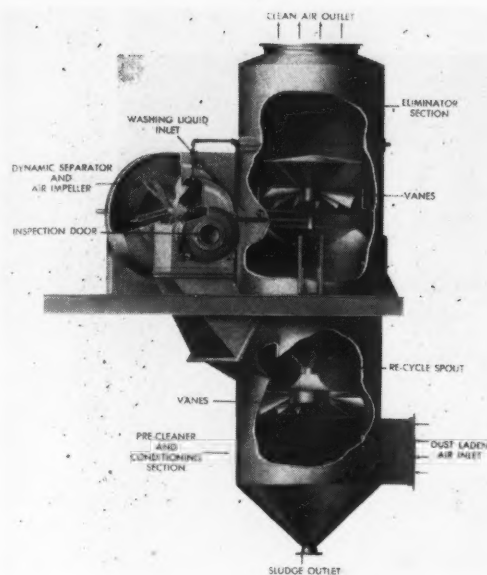
### **Collects abrasive materials, fine dusts at heavy loads and high temperatures**

**Uses:** Industrial dust control and recovery, such as control of dryer exhaust dust or dust from shot blast cleaning operation.

**Features:** Centrifugal air washer exhibits high collection efficiency when handling extremely fine dusts, abrasive materials, or heavy dust loads; particularly where considerable fines are present,



## PROCESSING EQUIPMENT



even at high temperatures.

**Description:** Collector combines centrifugal and washing action. Heavier particles are removed from gas stream in lower section by centrifugal action. Finer particles are agglomerated by washing liquid. Agglomerated particles also removed by centrifugal action. All washing liquid or sludge is removed from one drain outlet. Cleaned gas is discharged from the top of the unit. Units are available in sizes to handle from 900 to 32,000 cfm.

(Centrifugal Air Washer UW-4 is a product of The Ducon Company, Dept. CP, 147 East Second Street, Mineola, N.Y. . . . or for more information check 1286 on convenient Reader Service slip which is located opposite last page.)

### **Features article on heat exchanger thermal rating**

Descriptive article on thermal rating of heat exchangers by electronic computer is featured in 28-page review of company's activities. Flow diagrams for exchanger rating and LMTD correction factor, diagram showing sequential operations for exchanger rating, and completed rating sheet showing data and solutions reached by computer are included. Review also contains articles on zero-power nuclear reactor experimental installation, taconite processing plant, and incinerator plant.

"ALCO Products Review" is issued by ALCO Products, Inc., Div. American Locomotive Co., Dept. CP, PO Box 1065, Schenectady, N. Y. When inquiring specify 1287 on form opposite last page.

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# COST

also consider

# PERFORMANCE

**BE SURE—in your estimate of drying equipment costs—  
TO INCLUDE:**

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**LONGER EQUIPMENT LIFE**  
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**LESS OPERATING DOWNTIME**  
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**HIGHER PRODUCTIVITY**  
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**LOW MAINTENANCE COSTS**



Proctor is your best investment when you consider these factors in the selection of drying equipment.

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## PROCTOR & SCHWARTZ, INC.

Philadelphia 20, Pa.

Manufacturers of Industrial Drying Equipment and Textile Machinery.

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# ARROW

## AUTOPNEUMATIC CONTROL

for Complete Conditioning and Control of Compressed Air for Powering Pneumatic Tools—Cylinders—Valves and Appliances.



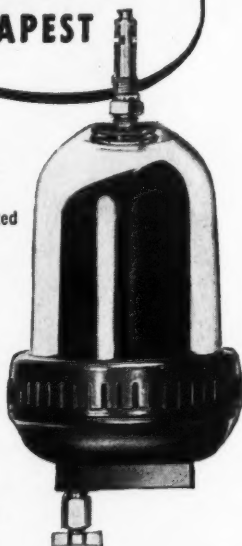
PIPE LINE SIZES

1/4"  
3/8"  
1/2"  
3/4"  
1"

THE BEST IS CHEAPEST

## AQUAMATIC DRAIN TRAP

- Automatically Drains Out Collected Moisture in Filter Bowl
- Visible Operation
- Non-Corrosive Parts
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- Double Sump Action
- Valve Prevents Air Locks
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for the laboratory



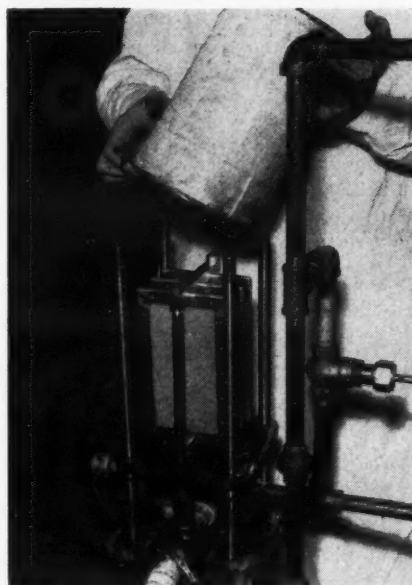
Photos by CP Staff

Miniature filter is geometrically scaled-down from production units. Project engineer at Foster D. Snell, Inc., places filter in operation

## SIMPLIFIES FILTRATION SCALE-UP PRO

**Need for large number of pilot plant tests is reduced by using miniature pressure leaf filter**

**WILLIAM C. CLARKE**, Assistant Editor  
with **GABRIEL APPLEMAN**, Acting Director of Engineering  
Foster D. Snell, Inc., New York, N. Y.



Filter with cover removed. Asbestos heating blanket covers filter shell. Flow is through stainless steel surface screens into filter leaves and out through base

**Problem:** Selection of production equipment from pilot filtration data at Foster D. Snell, Inc., was often made difficult because test results could not be scaled up in proportion to filtering area. Pilot development of sugar ester solutions for Sugar Research Foundation was being hampered by toxicity, flammability, and volatility of solvent used — ethylene dichloride — together with conditions required for filtration. Solution had to be filtered hot (80°C) to maintain reduced viscosity and prevent gelling in the filter. With boiling point of solvent at 83-84°C, heavy vapor losses would develop if an open filter system were used

CHEMICAL PROCESSING



# High Speed Reduction to Micron Sizes — No Attritional Heat!



Filtration pilot unit at Foster D. Snell, Inc., for sugar research. Reactor is at right. Filter is at lower left

## ENGINEERING FLUID-JET GRINDING IN "PACKAGE UNITS"

... comes naturally to Sturtevant engineers — with their 75-year tradition of successful solving of dry-processing problems. If you want to accomplish the most effective grouping of a Micronizer\* Grinding Machine with necessary compressor, feeder and dust-collector, it will pay you to investigate. Check the coupon on the right for more information.

Production Model  
(15 in. diameter  
grinding chamber)

Laboratory Model  
(2 in. diameter  
grinding chamber)

## Sturtevant Micronizer\* Grinding Machines Give Greater Finenesses than Tube or Roller Mills

**Look at the record!** 30 inch model reduced titanium dioxide to 1 micron and finer at solid feed rate of 2250 lbs. per hr. 24 inch model reduced DDT (50%) to 3.5 average microns — 1200-1400 lbs. per hr. 8 inch model reduced Procaine—Penicillin—to 5 to 20 microns—up to 20 lbs. per hr. Couldn't you use milling performances like these?

**No moving parts.** The particles grind each other. High-speed rotation and violent grinding impact of particles are caused by jets of compressed air or steam at angles to the periphery of the shallow grinding chamber. There are

no problems of attritional heat. Centrifugal force keeps over-sized particles in the grinding zone. Cyclone action in the central section classifies and collects the fines for bagging.

**Instant accessibility, easy cleaning.** Micronizer\* Grinding Machines come in seven sizes — each one constructed for quick accessibility and easy maintenance (typified by the "OPEN DOOR" design in other Sturtevant equipment). Grinding chambers range from the 2 in. laboratory size with ½ lb. per hr. capacity to the 30 in. size which handles up to 3000 lbs. per hr.

\* Registered trademark of Sturtevant Mill Co.

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When inquiring check 1290 opposite last page

## -UP PROBLEMS

— with consequent reduction of viscosity and increased gelling.

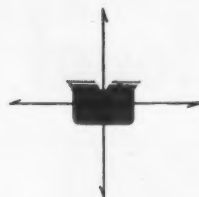
Foster D. Snell, Inc., in behalf of Sugar Research Foundation, had developed a detergent based on sugar. Natural fats and sugar were combined in a nonionic molecule. While basic research had been almost completed, pilot and production problems still remained to be worked out.

**Solution:** Experimental *miniature* leaf pressure filter with closed system was installed for Sugar Research Foundation pilot work. Bench-scale installation included pre-coat tank and positive-displacement pump. Test data were developed on filter pressure, quantity filtered (throughput), together with cake thickness, cake volume, and cake weight. If cake were to be washed, amount of residual liquor in cake would have been determined also.

To scale-up from test data, specific filtration flow rate in gal/hr/sq ft is plotted against time. Differential filtering pressure is also plotted as a function of time on same chart.

With aid of graphs, determinations are then made of pressure or flow rate at which production filtering run should terminate. From total throughput up to

(Please turn to page 163)



## CENTER FOR HIGH PURITY FUSED QUARTZ

Amersil processes for producing fused quartz and silica of the highest possible purity, in fabricated laboratory and production equipment—make Amersil the primary supply source for all industrial applications where such critical purity is a factor.

A fine service plan is keyed to your requirements. Here, complete ranges of standard apparatus, crucibles, trays, cylindrical containers and tubing (up to 25" diam.) are available for prompt delivery. Amersil engineers are available to assist in developing special equipment to individual requirements.

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You'll get the right nozzles quicker by calling Binks...manufacturers of one of the most complete selections ever produced.

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INDUSTRIAL SPRAY NOZZLES  
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When inquiring check 1292 opposite last page

## LABORATORY

**Allows heat sensitives  
to be fractionated...**

has distilland capacity to 1500 cc; regulation to 300°C

**Uses:** As laboratory fractionating still for separation of heat-sensitive materials.

**Features:** Brush still operates at pressures as low as one micron Hg.

**Description:** Still is designed for separation of materials with molecular weights up to 900. Unit has a distilland capacity of 100 to 1500 cc with distillation rate from a few drops to 100 cc per minute. Variable transformers provide exact regulation of distillant boiler up to 300°C. Vacuum gage indicates pressure between one and 1000 microns Hg.



(Type 4010-01 Brush Still is product of Rochester Division, Consolidated Electrodynamics Corporation, Dept. CP, 1775 Mt. Read Boulevard, Rochester 3, New York... or for more information check 1293 on form opposite last page.)

**Details complete line  
of electrodes**

Catalog of 16 pages details and illustrates manufacturer's complete line of spectroscopic electrodes and powders. Catalog discusses initial purity of raw material used and special protective packaging used to maintain purity. Special and regular grade electrodes are described, including preformed shapes.

Cat Section A-4004 "Spectroscopic Electrodes and Powders" is issued by National Carbon Company, Division of Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, New York. Specify 1294 on form opposite last page.

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## ALL ABOUT ENVIRONMENTAL TEST EQUIPMENT

This 20 page digest of the M & M line of environmental test equipment gives you quick facts on the application, performance and economies of Murphy & Miller equipment. Illustrates and describes the industry's most modern units—provides tips on selection and use of all types of environmental test units. Write for it today.



**MURPHY & MILLER, INC.**

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Doing research in coal, petroleum,  
chemicals?**

## REACTOR TUBE ELECTRIC FURNACE will simplify handling of laboratory and small pilot plant reactions

The Reactor Tube Electric Furnace, a vertical type furnace, is a compact unit, ready for immediate use — no rheostat nor additional equipment necessary. Its overall height is 52 inches; floor to bottom of furnace, 22 inches; heating element, 24 inches; reactor tubes up to 2 1/4 inches, O.D.

### ALL THESE FEATURES:

Range 100 to 1300° F • Chromel A heating element • Alundum core • Various tube diameters used • Takes reactor tubes up to 2 1/4 inches O.D. When smaller tubes are used, stainless steel liners are recommended (information on request). High temperature insulation throughout. Current—220 v., 60 cycle approx. 6.5 amps. Switch included. Ready to operate. Write for further information and prices.



## RESEARCH APPLIANCE COMPANY

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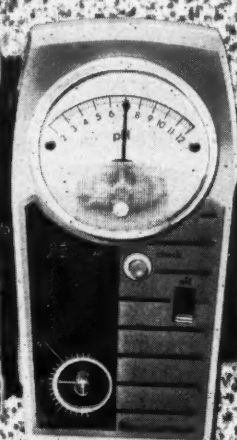
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instantly**



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America's Largest Manufacturer-Distributor of  
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When inquiring check 1297  
opposite last page

JANUARY 1957

### FOR THE LABORATORY

#### Filtration Scale-up

(Continued from page 161)

point of termination, expected average flow rate is calculated, and filtering area and time cycle of the production filter determined. Since filter is specified not only by filtering area, but also by cake volume, amount of cake deposited until termination of filtering run is also determined.

Pronto miniature filter used at Foster D. Snell is a vertical unit with one square foot of filtering area. Unit has three filter leaves at 1½" centers and is constructed entirely of stainless steel. Type 316 is used for all liquid contact parts and type 304 is used on the remainder. Leaves are covered with 24 x 110 Dutch weave metal cloth, bound in U-shaped frames. Leaf outlet nozzles are sealed by O-rings. Major pipe connections are located in base of frame so unit can be disassembled simply by removing nuts from four tie-rods. Electric heating blanket is used to maintain filtration temperatures.

Particular use in sugar research was to remove color and other bodies from sugar ester solution. Activated carbon (Darco S-51), ½ lb/15 gal, was used. Diatomaceous earth (Celite 535) was filter aid, ¼ lb/15 gal. Filter rate was 15 gal/hr.

**Results:** Miniature filter has reduced need for large number of pilot plant runs in developing data for suggesting production-sized equipment. In development work on sugar ester solutions, Foster D. Snell has found filter operates well with up to 90 cu in of solids per cycle and that test results, if necessary, can be scaled up exactly in a mathematically correct manner for selection of production equipment. Because unit is tank model and completely enclosed, there is no loss of solvent vapor. Problems of solvent flammability and toxicity are overcome. Since filter can be heated, required temperatures are easily maintained. Complete filter is cleaned easily after each run as filter does not use cloth in this application, though its design permits the installation of textile filter media.

(Pronto-Junior filter is product of American Plant Equipment Company, Dept. CP, 701 Spring Street, Elizabeth 4, New Jersey . . . or for more information check 1298 on form opposite last page.)

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magazine more useful to you?

See page 93

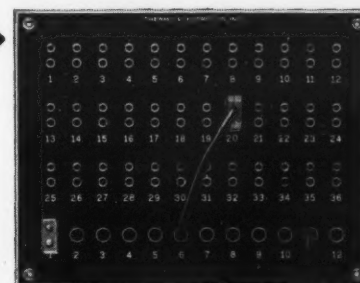
#### SWITCHING MANY THERMOCOUPLE OR RESISTANCE BULB CIRCUITS?



Temperature measuring applications are like tracks in a freight yard—they often need plenty of quick switching. Achieving both measuring accuracy and speed — especially with frequent switching — requires a system well suited to the individual circuit. Among Thermo Electric's four methods is one best suited to your needs.

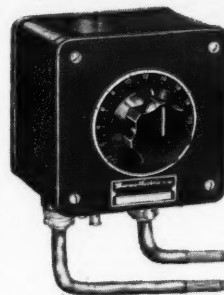
#### QUICK-COUPLING CONNECTOR PANELS

Provide great flexibility for transferring numerous thermocouples—ideal for patch panel use. Many compact shapes and sizes. Panel for 48 thermocouples and 16 pyrometers measures only 13¼ x 7½". Polarized plugs and jacks of standard thermocouple materials have long-wiping surfaces and spring loaded contacts for good electrical connections.



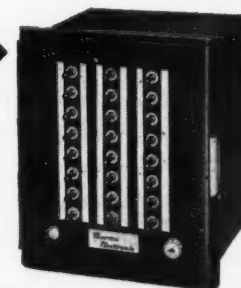
#### ROTARY SELECTOR SWITCH

For quick checking or switching of thermocouples or resistance bulbs. "Shorting-type" switches designed for flush panel or wall mounting. Contacts and wipers of same silver alloy. Three models have OFF to 6, 12 and 24 points.



#### KEY SWITCHES

Provide a choice of connecting many sensing elements to one instrument or transferring sensing elements from one type of instrument to another. Locking or non-locking construction.



#### PUSH-BUTTON SWITCHES

For on-off checking of temperatures from many points or averaging any number of temperatures on one indicator.

**Single Case Construction** 12-72 points for push buttons,  
12-144 for keys.

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Connector Panels No. 23-R  
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## Thermo Electric Co., Inc.

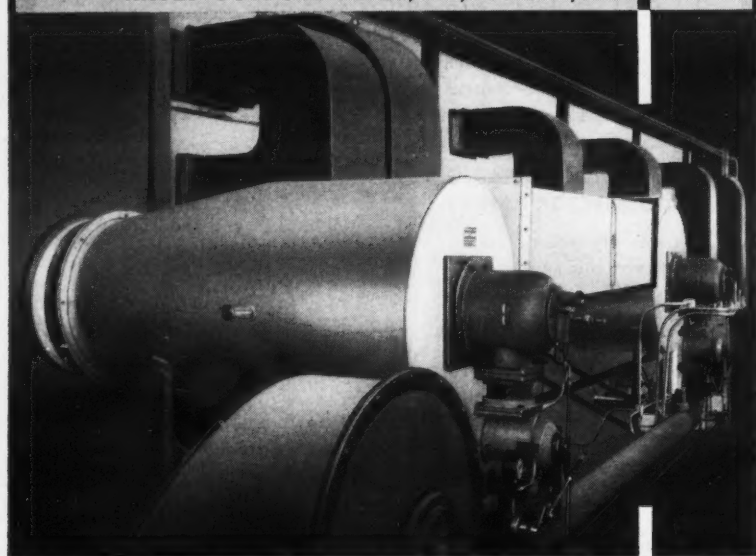
SADDLE BROOK, NEW JERSEY

In Canada — THERMO ELECTRIC (Canada) Ltd., Brampton, Ontario

When inquiring check 1299 opposite last page

## THERMAL'S PACKAGED AIR HEATERS

RATED OUTPUTS TO 20,000,000 BTU/hr



### COMPACT...OIL OR GAS FIRED

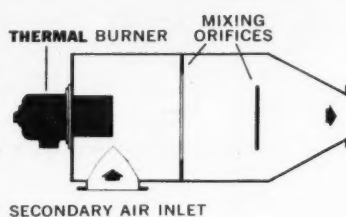
Extremely versatile design permits the THERMAL Type CA heater to be used in a wide variety of installations and with either gas, oil or combination firing. Shown here is a tunnel dryer installation of the Edgar Plastic Kaolin Co., Edgar, Florida. THERMAL CA air heaters with #7028 burners provide 4,000,000 BTU/hr each using #2 fuel oil. These air heaters are equally adaptable to kilns, ovens, spray dryers and many other installations where products of combustion may be mixed with the air.

#### NO REFRACTORY REQUIRED

The CA air heater is built around the THERMAL high velocity burner. Because of its unique design, combustion takes place almost entirely within the burner. It normally requires no refractory and provides maximum utilization of available space.

WRITE FOR BULLETIN #104

OTHER THERMAL PRODUCTS & SERVICES



THERMAL'S all-metal, welded construction keeps maintenance costs at a minimum. CA air heaters are supplied as complete "package" installations with outputs ranging from 200,000 BTU/hr to over 20,000,000 BTU/hr at all pressure levels.

Gas, Oil & Combination Gas-Oil Burners •  
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FOR THE LABORATORY

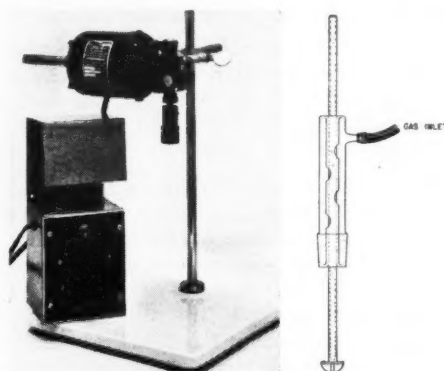
## Introduces gas through stirrer for good dispersion

Hollow glass stirring rod designed for use with controlled speed drive

**Uses:** As a laboratory stirrer where gas is admitted under liquid surface as a reagent or as an aid in agitation.

**Features:** Hollow glass stirring rod permits small bubbles of gas to be dispersed at the focal point of stirrer's action.

**Description:** Adjustable speed stirrer employs a series-wound DC motor with direct drive and a phase-shift thyatron. Motor is rated for 1/50 hp,



Controlled speed motor (left) and drawing of hollow glass gas disburser (right)

fully enclosed. This arrangement provides adequate power at low speeds as well as high, and motor does not tend to heat up at low voltage.

Speed at drive shaft is about 400 to 4000 rpm in stepless control — gear driven shaft runs at 1/18 of this speed. Motor may be run in either direction.

Special gas disbursing stirrer for use with this motor employs a hollow spindle and bearing which admits gas to the spindle. Gas is thrown out in small bubbles for intimate contact with liquid being stirred or to provide agitation.

(Stirrer is a development of Ace Glass Incorporated, Dept. CP, Vineland, N. J. . . . or for more information check 1301 opposite last page.)

Vapor pressure of media for temperature sensing devices — see convenient nomograph on page 204



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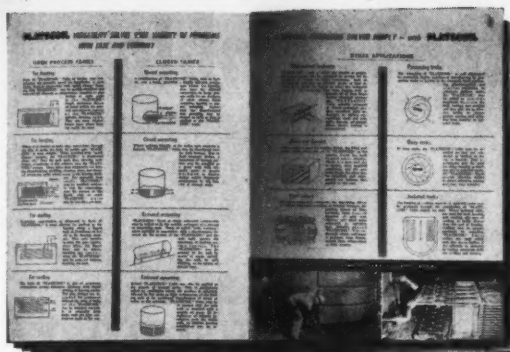
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CHEMICAL PROCESSING





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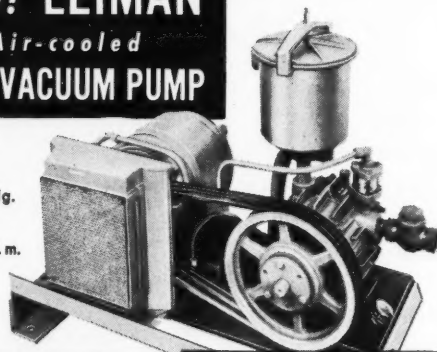
**PLATECOIL**  
Division  
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LANSING 4, MICHIGAN

You'll Find our Catalog in Sweet's Plant Engineering File.

When inquiring check 1302 opposite last page

### New! LEIMAN Air-cooled HIGH VACUUM PUMP

VACUUMS  
24 to 29.9" Hg.  
CAPACITY  
15 to 40.8 c. f. m.



Air-Cooled pump operates  
24 hours a day at 140°F.

This air-cooled Leiman Rotary Positive High Vacuum Pump gives you greater capacity in a smaller pump—a compact pump unit that can be placed anywhere. It incorporates the Leiman 2-wing rotary pump, with steel blades, cast iron cylinders and patented automatic wing adjuster which assures leak-proof seal for years and years. Put one on test.

Write for detailed folder and prices.

**LEIMAN BROS., INC.**  
220 Christie St., Newark 5, N. J.

#### FEATURES

- Radiator-cooled lubricating system circulates pre-cooled oil through pump
- Eliminates vapor
- Eliminates water-cooling—piping—leakage
- Can not overheat
- Saves floor space 30" long—27" high—21" wide

Other Leiman Air Pumps:  
Vacuums to 29.9" Hg.  
Pressures to 20 psig.  
Capacities to 162 c.f.m.  
Get complete catalog.

When inquiring check 1303 opposite last page

#### LABORATORY

### Drop radioactive sample "down the well" . . .

scintillation counter makes  
maximum use of activity

Uses: Scintillation well counter is designed for efficiency in detecting gamma-emitting radioactive materials.

Features: Employing a large sodium iodide "well" crystal,



Counter contains its own pre-amplifier

counter attains an efficiency of 50 percent for  $I^{131}$  and 45 percent for  $Co^{60}$ .

Description: Designed to use efficient "well" counting geometry, this unit can attain maximum statistical accuracy with small amounts of radioactivity. It employs a one-tube feedback amplifier with a gain of 10 to provide negative output for scaler or ratemeter use or a cathode follower output with a gain of two.

Unit stands 17½ inches high and weighs 85 pounds. Required power includes high voltage of 900 to 1500 volts (20 microampere drain at 900 volts), preamplifier draws 6.3 volts at 0.4 amp and 150 volts at 8 milliamp.

(Model DS-3A scintillation well counter is a product of Nuclear Instrument and Chemical Corp., Dept. CP, 223 W. Erie St., Chicago 10, Ill. . . or for more information check 1304 on form opposite last page.)

## ANNOUNCING NEW fire resistant impact resistant DEKORON INSTRUMENT TUBING HARNESS

FLAME RETARDANT  
OUTER SHEATH

FIREPROOF  
AA  
ASBESTOS

YOU CAN BURN IT

YOU CAN BANG IT

EXTRA HEAVY  
THERMAL and SHOCK  
ABSORBER

NEW LINEAR POLYETHYLENE

YOU CAN BURY IT

You can't beat all-plastic Dekoron Poly-Cor for chemical resistance or for ease of installation. And now, the new Dekoron Instrument Tubing Harness adds yet another revolutionary feature—fire resistance.

For example, in the direct flame of a cutting torch, it lasted longer than any other multiple-tube harness. Use it in areas where flash fires are anticipated. And new Dekoron Instrument Tubing Harness is rugged, too. You can bury it and forget it.

You get all the advantages—chemical, impact and fire resistance—wrapped up in a single bundle with new Dekoron Instrument Tubing Harness. Remember, you can burn it . . . you can bang it . . . you can bury it. And you can buy it now.

AA-4022

**Dekoron® products**  
QUALITY • RESEARCH • SERVICE

SAMUEL MOORE & COMPANY  
DEKORON PRODUCTS DIVISION  
MANTUA, OHIO

When inquiring check 1305 opposite last page

operation:

FULLY AUTOMATIC, SAFE,  
HIGH PURITY, ECONOMICAL

results:

PURE NITROGEN WITH  
CONTROLLABLE HYDROGEN CONTENT  
PRODUCED AT LOWEST COST

application:

FOR MATERIAL OR PROCESS

## NITRONEAL GAS GENERATOR

Pure nitrogen is produced by this equipment with a controllable hydrogen content that can be varied to meet changing requirements and maintained at any desired percentage between .25% and 25%.

Write for additional data on how the Nitroneal Gas Generator can be applied to your process or in your plant.

Request FREE,  
informative booklet No. 21.

**BAKER** PRECIOUS  
& COMPANY INC. METALS

113 ASTOR ST., NEWARK 5, N. J.

ENGELHARD INDUSTRIES

NEW YORK • SAN FRANCISCO • LOS ANGELES • CHICAGO

When inquiring check 1306 opposite last page

## if YOUR PROCESS DEMANDS FILTERING, MIXING, STORING

### Check

#### THE ADVANTAGES

Get your copy of our new catalog - see for yourself. There's a difference in Alsop design, construction features, and workmanship that means better, faster, labor-saving operations for you.

CLIP AND MAIL THIS COUPON

ALSOP ENGINEERING CORP.  
1201 Alsop Square, Milldale, Conn.

GENTLEMEN:

Send me your new catalog of Alsop Filters, Mixers, and Tanks

NAME \_\_\_\_\_

COMPANY \_\_\_\_\_

STREET \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_

**ALSOP FILTERS - MIXERS and MIXING TANKS**

When inquiring check 1307 opposite last page

## LABORATORY

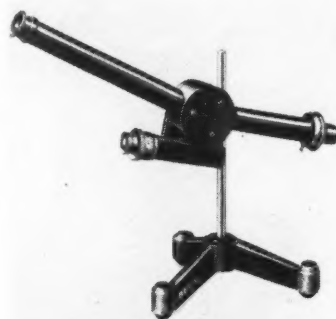
**Resolves visible spectra  
to one Angstrom . . .**

spectrometer is direct reading  
in range from 4000 to 8000 Å

Uses: Visible light spectrom-  
eter reads to one Angstrom.

Features: Direct reading drum  
is calibrated from 4000 to 8000  
Angstrom units.

Description: Wave length of  
visible light is readable directly



Dispersion of spectrometer is 43  
degrees

to nearest Angstrom unit. Accu-  
rate readings are made by align-  
ing same bands of two spectra.  
These are reversed (with respect  
to one another) and move in op-  
posite directions across the field  
when micrometer screw is turned.

When these lines have been  
aligned, direct reading drum shows  
wave length of the line in question.

(Beck 3505 spectrometer is avail-  
able through the Ealing Corp.,  
Dept. CP, Natick, Mass. Check  
1308 opposite last page.)

**Explains how to choose  
optical magnifier**

Booklet of 16 pages explains  
how to choose correct optical  
magnifier for specific need and  
how to get best performance  
from instrument.

Bul 1-52,60 on optical magni-  
fiers is issued by Bausch & Lomb  
Optical Company, Dept. CP,  
635 St. Paul St., Rochester, N.Y.  
Specify 1309 opposite last page.

## don't gamble...



### with LABORATORY GLASSWARE

Why take chances? When you buy  
laboratory glassware, get the pre-  
cision and accuracy and uniformity  
you pay for . . . yet, keep your eyes  
open to the economy of the Doerr  
Diamond D Blue Line.

Here is laboratory glassware at its  
finest . . . sharply etched, accurately  
manufactured, and double tested.

Don't gamble on quality! Send for de-  
tailed information on the Diamond D Blue  
Line right away.

**DOERR GLASS CO.**  
Vineland, N. J.



When inquiring check 1310 opposite last page

## NEW POCKET CALCULATOR For Liquid Batch Mixing

**CAPACI-DIAL for  
PNEUMIX  
AGITATORS**

Simply turn the  
pointer to the par-  
ticular volume and  
consistency of your  
batch. The selector  
automatically tells  
the best size Pneu-  
mix Agitator to do  
your mixing.



The attached  
coupon will  
get you one  
without  
obligation.

**ECLIPSE AIR BRUSH CO.**  
390 Park Ave. Newark 7, N.J.

Please send free CAPACI-DIAL to:

Name .....

Company .....

Address .....

When inquiring check 1311 opposite last page

CHEMICAL PROCESSING



## FOR THE LABORATORY

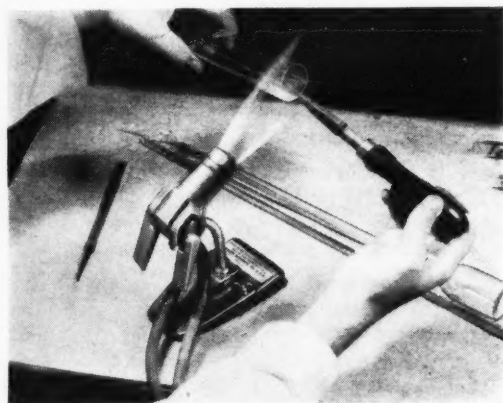
### Noiseless blast from burner achieved through mixing, burning externally . . .

will operate with any type of gas and 5 to 10 psi O<sub>2</sub>

**Uses:** For high temperature laboratory work such as crucible ignitions, ore fusions, coke button tests, and for glass blowing. Burner will melt Pyrex-brand glass up to 75 mm diam and Vycor-brand glass up to 25 mm.

**Features:** Since gases are directed by channels in the burner body to a double ring of holes in the tip, oxygen and supply gas are broken into small streams and mixed externally. Result of this is a hot flame which is silent.

**Description:** Noiseless blast burner adjusts for flame size with one hand control. Tips need not be changed in switching from one flame to another. Since gases are mixed externally, there is no danger of striking back when large flames are used.



Flame size is adjustable

Burner will operate with any gas (artificial, natural, or LP) at normal gas-line pressure. Oxygen pressure is not critical — it can be 5 to 10 psi.

(Noiseless blast burner is a development of Fisher Scientific Co., Dept. CP, 303 Forbes St., Pittsburgh 19, Pa. Check 1312 opposite last page.)

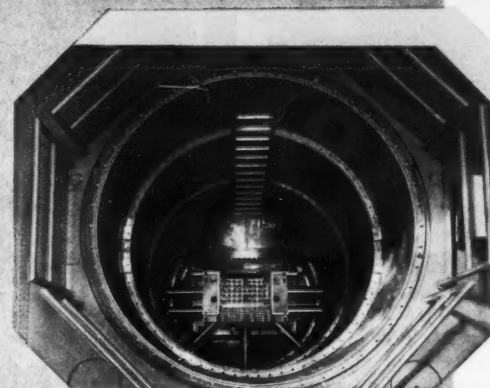
### Straight-line temperature control — convection ovens have it

Featured in four-page bulletin are convection laboratory-size ovens using automatic proportional wattage control. Temperature variations are held down to 1½° at 316°C. Muffle furnaces and pyrometers are also described.

Bul 5660 is issued by Blue M Company, Dept. CP, 138th & Chatham St., Blue Island, Ill. When inquiring specify 1313 on form opp. last page.

*another example of exciting work at los alamos...*

## OMEGA WEST



Los Alamos Scientific Laboratory is a  
non-civil service operation of the  
University of California for the U. S.  
Atomic Energy Commission.

Omega West, newest of the research reactors at Omega site in Los Alamos, is one of several reactors in operation or under development at the Laboratory. The OWR is designed for high flux at low cost, flexible operation, and has extremely versatile port facilities. This installation is an important addition to the impressive array of research facilities available to Los Alamos scientists.

The Laboratory is interested in receiving employment applications from engineers and scientists of superior qualifications. Direct your inquiry to:

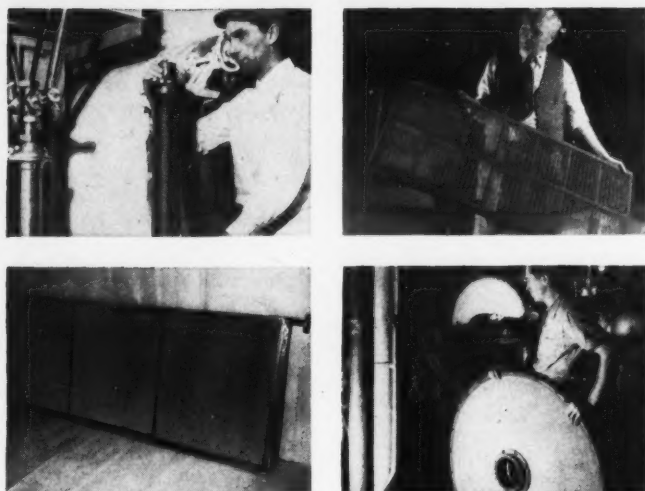
Department of Scientific Personnel  
Division 1602

los alamos  
scientific laboratory

OF THE UNIVERSITY OF CALIFORNIA

LOS ALAMOS, NEW MEXICO

## when you need WIRE CLOTH PARTS



## Call Cambridge for accurate production, fast delivery

Our engineers in the field and in the home office are ready to discuss your wire cloth fabrication problems at all times. They'll help you select weaves, mesh sizes and metals to meet your needs and draw up prints for your OK . . . or, they'll start the factory working from your prints. Whether orders are small or large, you're assured of strict adherence to specifications by close manufacturing supervision.

Your parts will be fabricated from any conceivable type of industrial wire cloth, selected from the complete Cambridge line. Specifications from the finest to the coarsest mesh in any metal or alloy are usually met from stock, assuring the speediest delivery. Individual loom operation and careful inspection provide the maximum in mesh size uniformity and mesh count accuracy.

### IF YOU BUY WIRE CLOTH IN BULK . . .

You can get immediate delivery on large or small orders for the most frequently used types of cloth. If your needs are not in stock, we'll schedule our looms to get your material to you without delay.

**LET US QUOTE** on your next order for fabricated parts or wire cloth in bulk. Call your Cambridge **FIELD ENGINEER**—he's listed under "Wire Cloth" in your classified telephone book. **OR**, write direct for **FREE CATALOG** and stock list giving full range of wire cloth available, description of facilities and metallurgical data.



**The Cambridge Wire Cloth Co.**

WIRE CLOTH  
METAL CONVEYOR BELTS  
SPECIAL METAL FABRICATIONS

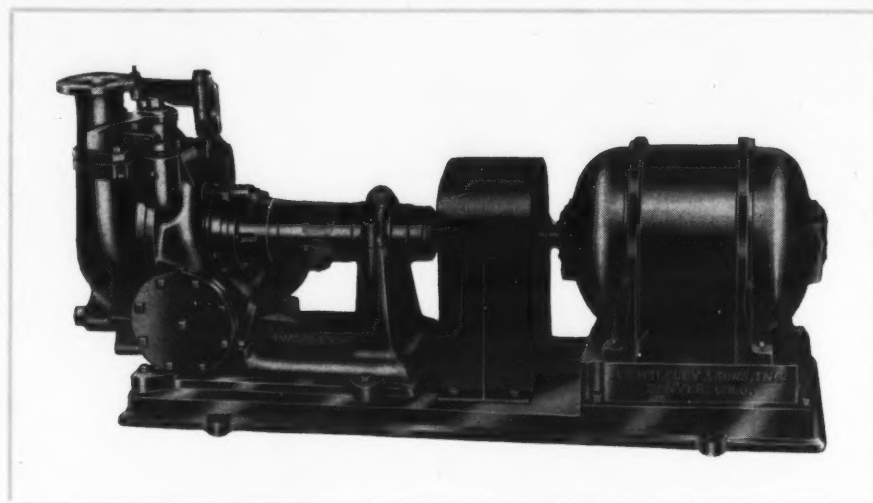
Department F,  
Cambridge I,  
Maryland



OFFICES IN PRINCIPAL INDUSTRIAL CITIES

When inquiring check 1314 opposite last page

## engineering and maintenance



Centrifugal seal of pump is principal factor that makes it able to handle abrasive slurries

About three impellers and one casing had to be replaced every month on previous pump, costing 700-\$800 per month in maintenance. Then sand pump was installed which —

provides excellent service  
pumping 53% silica slurry

**GORDON WEYERMULLER**, Associate Editor

With **RAY GEORGE**, Senior Maintenance Engineer  
Westvaco Chlor-Alkali Division  
Food Machinery & Chemical Corporation  
South Charleston, West Virginia

**Problem:** Conventional open-impeller, single-suction iron pump used for handling a 53% slurry of silica flour at the Westvaco plant in South Charleston, W. Va., cost \$700-800 every month in maintenance. About three impellers and one casing had to be replaced every month.

Pump was used to transfer the highly abrasive slurry at a temperature of 194°F to large autoclaves. Here the sodium silicate slurry is used to produce Magnesol, Westvaco's magnesium silicate, which is used as an industrial absorbent powder. In the process, sodium silicate of the de-

sired alkalinity is made by the batch digestion of an excess of pure silica flour (95% passing through 200 mesh) in 50% liquid caustic soda under pressure at 350°F.

In order to improve performance of pump used for handling the 53% silica slurry, entire unit was replaced with one made from a corrosion-resistant alloy. Service life of this pump was still only about four weeks. Use of another alloy later only increased service life to six weeks.

**Solution:** Plant replaced previous pumps with a Model K centrifugal sand

pump, s  
abrasive  
that repl  
ter for s

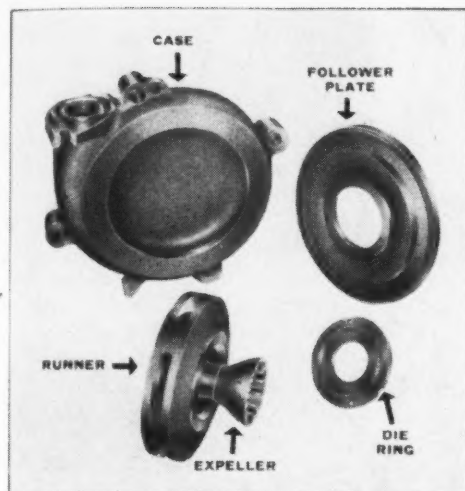
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rosion-res  
or ground  
parts. Pur

**Results:**  
pump is s  
very exce  
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only abou  
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present pu  
tenance sch  
(Model K  
by A. R. V  
2330, Der





Four wear parts of pump — case, runner die ring, and follower plate — can be easily changed

pump, specifically designed to handle extremely abrasive slurries. This pump has a centrifugal seal that replaces the usual stuffing box and gland water for sealing shaft.

Centrifugal seal consists of a revolving member, called an expeller. Revolving member is set close to the stationary member, which acts as a side-wearing plate. Material being pumped is kept from leaking out by centrifugal action of expeller.

Centrifugal seal eliminates stuffing box troubles and makes the pump especially suitable for handling gritty pulps, abrasive slurries, and sludges. Wear on the shaft is eliminated and proper mounting of ball bearings made practical. Seal operates in intake chamber against intake head only and is subject to little wear. Four wear parts — case, runner, die ring, and follower plate — can be changed within a few minutes without disturbing intake or discharge piping.

Pump parts are made unusually heavy in order to increase time between changes. Standard parts are made from a special alloy iron. Although not needed for the Westvaco pump, rubber and corrosion-resistant alloy parts are available. Machined or ground joints are not required on the pumping parts. Pump delivers 100 gpm with 50' head.

**Results:** After four years service, the sand pump is still operating satisfactorily. It has given very excellent service. Instead of 700-\$800 per month maintenance needed on previous pump, only about \$10 per month maintenance is required on present pump. This low expenditure on the present pump is partly due to the preventive maintenance schedule of inspection at Westvaco.

(Model K centrifugal sand pump is manufactured by A. R. Wilfley & Sons, Inc., Dept. CP, PO Box 2330, Denver, Colorado. Check 1315 opp. last page.)



JACK B. RINCKHOFF (right), Chief Engineer, Sulphuric Acid & Phosphates Dept., Chemical Construction Corp., N. Y. City. Left, Michael De Piano, New York Cooper Alloy Representative.

## RINCKHOFF OF CHEMICAL CONSTRUCTION answers 3 questions on Cooper Alloy Valves

**Q.** Mr. Rinckhoff, in specifying equipment for the  $H_2SO_4$  plants that Chemico constructs around the world, what Cooper Alloy valve models do you buy most of?

**A.** Over 80%, I'd say, are OS&Y type gate valves, in sizes 1" to 8"

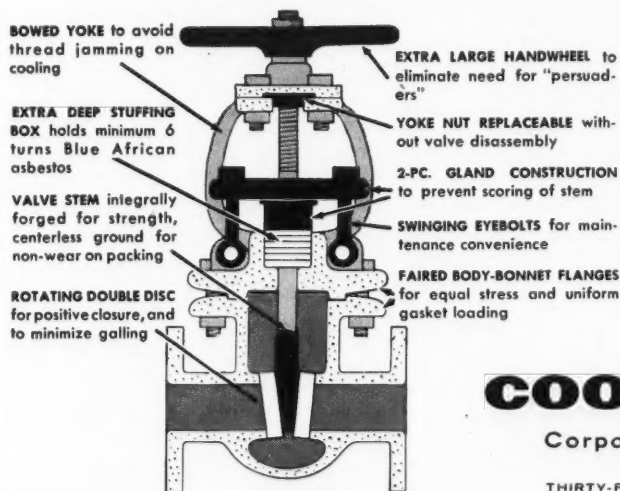
**Q.** What's your most important reason for

buying Cooper Alloy valves?

**A.** Availability. Your chain of distributors across the country and in remote parts of the world is of great importance to us. In foreign construction we have often specified Cooper Alloy because of this all-important availability.

**Q.** What about design and quality?

**A.** Vital. Valve design determines performance, and our specifications are rigid. As a construction company, we can't afford to jeopardize our reputation by installing questionable equipment. Cooper Alloy valves have passed our tough specs, and have my approval for all severe construction applications.



### A VALVE DESIGNED FOR STAINLESS!

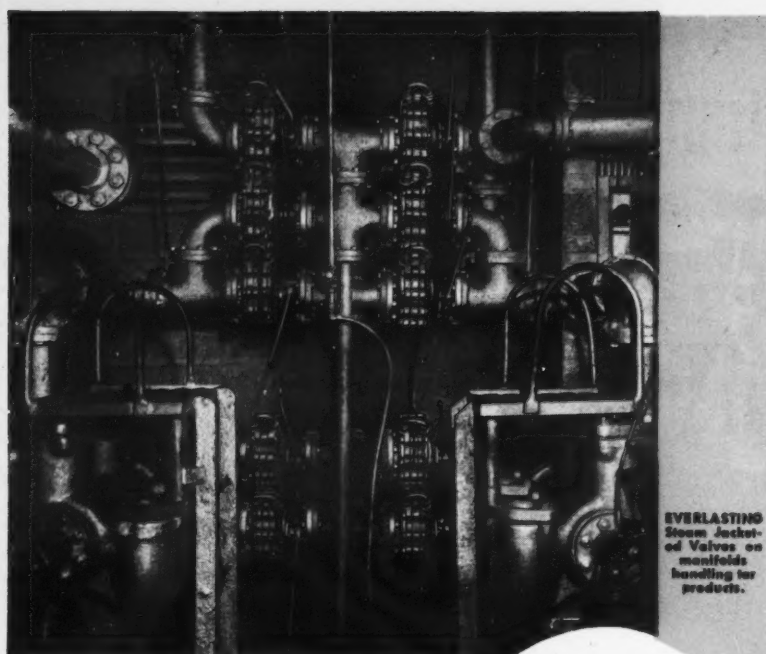
The Cooper Alloy valve is not an adaptation of earlier brass and iron patterns. Cooper Alloy, with over 35 years of experience in handling stainless steel, created a valve designed to be cast in stainless! Check the Special Design Features shown at left.

As the little CA man below is saying: "You can tell a Cooper Alloy Valve as far as you can see it!" Write today for your copy of our folder "Design Factors In Stainless Steel Valves." The Cooper Alloy distributor near you will be glad to show you the complete line of Cooper Alloy valves and fittings, and their advantages. He can serve you promptly from local stocks.

**COOPER ALLOY**

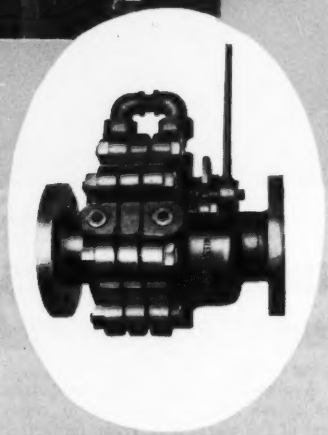
Corporation • Hillside, New Jersey  
VALVE & FITTING DIVISION  
THIRTY-FIVE YEARS OF STAINLESS STEEL PIONEERING

When inquiring check 1316 opposite last page



EVERLASTING  
Steam Jacketed  
Valves on  
manifolds  
handling tar  
products.

## Jacketed Valves that keep Viscous Materials flowing freely



### Note these features:

for

coal tar products,  
asphalt, pitch,  
resins, varnish,  
waxes, paraffin,  
molten sulfur,  
etc.

Extra-large jacket space  
Straight-through flow  
Drop-tight seal  
Non-wedging discs  
Quick-acting lever

Write for descriptive bulletin and  
our 60-day free trial offer.

For "everlasting" service, use

# EVERLASTING Valves

EVERLASTING VALVE CO.  
73 FISK STREET, JERSEY CITY 5, N. J.

When inquiring check 1317 opposite last page

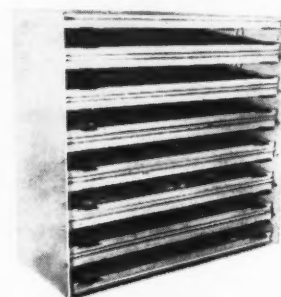
## ENGINEERING & MAINTENANCE

### Variety of renewable filter media aids dry-type air filter to high efficiency . . .

desired efficiency in dust and smoke removal  
can be obtained at low cost

**Uses:** Filter was developed for those applications that require air filters of standard construction but need higher-than-normal cleaning efficiencies. It is especially suitable for chemical plants, pharmaceutical laboratories and other specialized fields.

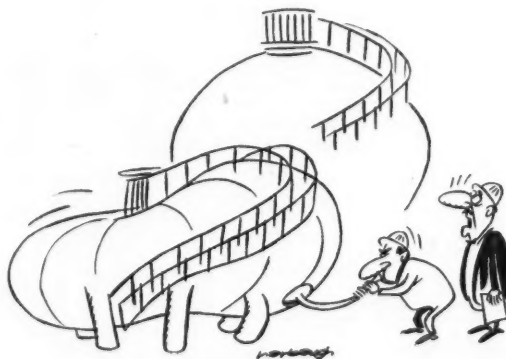
**Features:** Effectiveness can be regulated by varying filtered media to obtain any desired efficiency, even at extremely high temperatures and with minimum operating cost. Media range from inexpensive cellulose sheets to glass fiber mats. A variety of thicknesses, densities, and textures can be used.



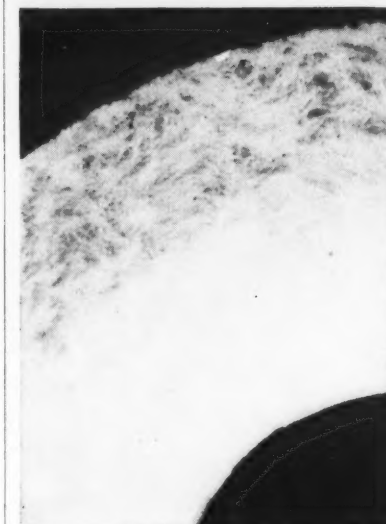
One 2'x2'x22 3/4" unit contains more than 50 sq ft of media

**Description:** Media frames insure a perfect seal and make media servicing simple and inexpensive. One 2'x2'x22 3/4" unit contains more than 50 sq ft of media in seven "pockets." Filtering media is held in place by removable retainers that apply spring tension on three edges to provide positive air seals.

(Multi-Pak Air Filters are a product of American Air Filter Company, Inc., Dept. CP, 215 Central Avenue, Louisville 8, Ky. . . or for more information check 1318 on form opposite last page.)



## FILTRATION NEWS



CROSS-SECTION through new white MICRO-KLEAN element. Graded density provides filtration in depth, gives longer life, more complete solid removal.

## NEW 5-micron filter

Provides 50% longer service life,  
polishes, purifies liquids to sparkling  
clarity, handles highly alkaline fluids

Cuno's new white MICRO-KLEAN filter cartridge (No. 2278-B2) brings a new degree of clarity and purity to beverages and other fluids demanding the utmost in filtration.

It's guaranteed to remove 98% to 100% of particles larger than 5 microns on the first pass of fluid plus a large percentage of particles down to 1 micron in size.

And, the new cartridge, retaining the true graded density features of Cuno's MICRO-KLEAN cartridge, lasts up to 50% longer than previous cartridges on recommended applications.

White MICRO-KLEAN is made of cellulose fibres, firmly bonded together with a totally inert resin. There's no possibility of contaminating fluid with harmful or bad tasting substances. What's more, the rigid structure formed by the bonding material prevents rupturing, channeling or distortion of the filter element.

Write today for the complete story on this latest advance in fluid purification. The Cuno Engineering Corporation, 5-1 South Vine Street, Meriden, Connecticut. 6.5



AUTO-KLEAN (edge type) • MICRO-KLEAN (fibre cartridge)  
FLO-KLEAN (wire-bound)  
PORO-KLEAN (porous stainless steel)

When inquiring check 1319  
opposite last page

CHEMICAL PROCESSING

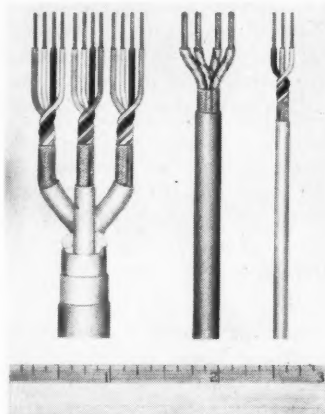


**Broad working temp range,  
-90 to +250°C, offered  
by cable . . .**

single through 37 conductors  
are available

**Uses:** Leads for rotating equip-  
ment, potted circuits, high-tem-  
perature instrumentation, or tele-  
metering devices.

**Features:** Cable is available in  
standard and custom designed  
constructions from single through  
37 conductor assemblies. Work-



Primary insulation is parallel-  
wrapped, spiral-wrapped, or ex-  
truded Teflon

ing temperature range is -90 to  
+250°C.

**Description:** Primary insula-  
tion on conductors is parallel-  
wrapped, spiral-wrapped, or ex-  
truded Teflon. Wires may be indi-  
vidually shielded or supplied with  
an overall silver-plated copper  
shield. For high-temperature appli-  
cations a Teflon outer jacket is  
recommended.

(Multi-conductor cable is a prod-  
uct of Tensolite Insulated Wire  
Co., Inc., Dept. CP, 198 Main  
St., Tarrytown, N. Y. . . . or for  
more information check 1320 on  
convenient Reader Service slip  
located opposite last page.)

For more information on prod-  
uct at right, specify 1321 . . .  
see information request blank  
opposite last page. ➡

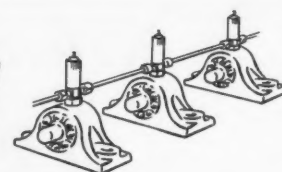
# Just 4 Easy Steps to Automatic Lubrication From One Central Point

with an **ALEMITE**  
**Accumatic®** System

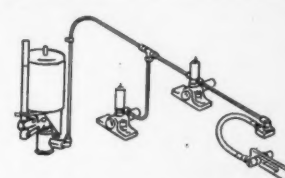
**FASTER . . . FOOLPROOF . . . LESS COSTLY!**



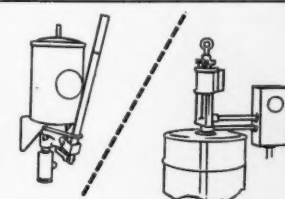
Replace grease cups or  
grease fittings with Accu-  
matic fittings. (Available in  
same thread sizes as grease  
fittings, cups.)



Connect Accumatic fittings  
with copper tubing. (Alemite  
has tubing, clips and acces-  
sories for easy installation.)



Connect sliding, rotary or os-  
cillating parts into tubing  
system. (Flexible hose and  
swivels for moving parts.)



Provide central pump to sup-  
ply lubricant to system. (Or-  
dinary hand pump or fully  
automatic barrel pump.)

## The fitting that "thinks for itself!"

The Alemite Accumatic System  
eliminates the work, worry and  
"human error" of manual lubri-  
cation. It fits directly on bearings—  
meters an exact shot of oil or  
grease automatically—at pre-  
determined intervals—while the  
machine operates. Cuts labor, pro-  
duction and maintenance costs!

## Factory-tested— field-proved!

Grueling field tests show no ap-  
preciable variation in the amount  
of lubricant discharged after  
73,312 cycles—equal to 122 years  
of twice-a-day service!

## ALEMITE ACCUMATIC ADVANTAGES!

- Prevents application of wrong lubri-  
cant.
- Eliminates product spoilage due to  
over-lubrication.
- Seals completely against damaging  
dirt, grit and water.
- Eliminates point-by-point lubrication  
methods—services all bearings in one  
operation.
- No parts are neglected—lubricates in-  
accessible and dangerous bearings at  
regular intervals.
- Delivers exact amount of lubricant to  
bearing.

# ALEMITE

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A Division of STEWART-WARNER CORPORATION

STEWART  
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WARNER

## FREE! Alemite Accumatic Catalog

Alemite, Dept. D-17  
1850 Diversey Parkway, Chicago 14, Illinois

Please send me my free copy of the complete Accumatic Catalog.

Name .....

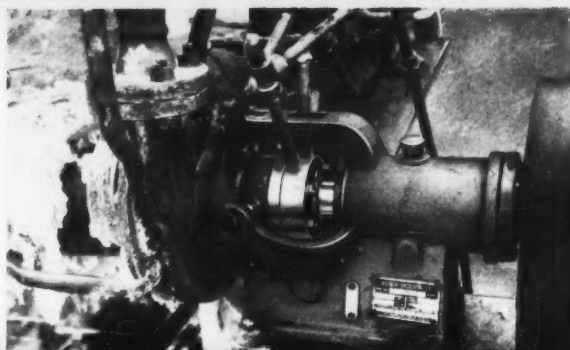
Company .....

Address .....

City ..... Zone ..... State .....



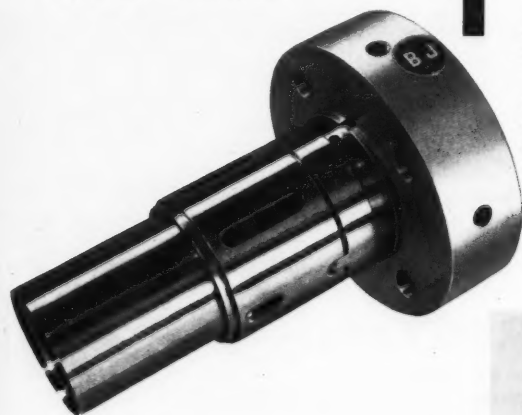
**BEFORE...packing on our  
ammonium nitrate pumps  
lasted only 3 to 6 days**



**NOW...**

**BJ MECHANICAL SEALS  
GIVE CONTINUOUS SERVICE  
...with only a single face change\***

Byron Jackson makes a complete line of standard and special BJ Mechanical Seals to solve most pump stuffingbox problems...including high pressure, high temperature, corrosive and volatile fluid services. Write today for BJ Mechanical Seal bulletin, specifying pump service involved.



**\*..says Geo. E. Frey, Production Supt., Spencer Chemical Co., Henderson, Kentucky.** "On our Spensol unit—used to manufacture nitrogen fertilizer solutions—we employ pumps that are in continuous use. It is important to us that these pumps perform at peak efficiency at all times with a minimum of maintenance. We were very unhappy to find that the packing we were using on these pumps was lasting only three days to a week which meant constant, bothersome, costly maintenance.

"We decided to switch to Byron Jackson Mechanical Seals to eliminate this problem. We installed BJ Type U Mechanical Seals on our pumps.

"After more than a year of continuous service, our only maintenance on these seals has consisted of replacing the rotating faces once. Naturally, we are highly pleased with the effective operation of the Byron Jackson Seals and plan to use them in this service from now on."

**Byron Jackson Pumps  
INCORPORATED**

A subsidiary of Borg-Warner Corporation  
P.O. Box 2017A, Terminal Annex  
Los Angeles 54, California

**BJ**

When inquiring check 1322 opposite last page

## ENGINEERING & MAINTENANCE

**Bakelite saves time and money  
with preventive maintenance  
and planning program . . .**

procedure in operation for past four years  
has increased available equipment time

An additional 18 hr of production time a week in a single department . . . has been one result of pre-scheduled shutdown and preventive maintenance program now in effect at Bakelite Co., Div. of Union Carbide and Carbon Corp., Bound Brook, New Jersey.

Based on number of hours of scheduled production time and number of operating units, reduction of downtime has supplied the additional hours previously not available because units were down for repairs. Cost of each maintenance shop order processed has decreased and spot checks show that preventive maintenance inspections and repairs cost less than estimated cost of breakdown repairs.

Production at Bakelite is, for the most part, a batch operation with some departments shutting units down frequently for product changes. A little over four years ago maintenance planning, scheduling, and preventive maintenance program was inaugurated.

Primary purpose was to minimize downtime of production equipment and lower cost of maintenance by 1) decreasing number of equipment breakdowns, and 2) making corrections early before expensive, time-consuming repairs were necessary.

Inspections are heart of preventive maintenance program. Routine inspections, usually performed while equipment is in operation, are made weekly or more often. Periodic inspections are made at intervals longer than one week at a time when equipment is shut down. Maintenance history of equipment is kept on equipment record cards. Card entries point out repetitive failures, causes of which are then investigated. Acquisition of new machinery is, in part, determined by a study of equipment record cards to evaluate suitability in a particular location or production line.

Prescheduled shutdown is another phase of program. Essential features of this procedure are:

- 1) A mutually agreed upon, published schedule which lists shutdowns of respective units as they are to occur in any one week.
- 2) A list of ready-to-schedule jobs on all units to be shut down.
- 3) Determination of a definite shutdown date.
- 4) Shut down and report.

All operating units are scheduled six months in advance for periodic shutdowns for repairs, overhaul, and preventive maintenance inspections.

Records show that 83% of all maintenance work done is now planned in advance. Maintenance



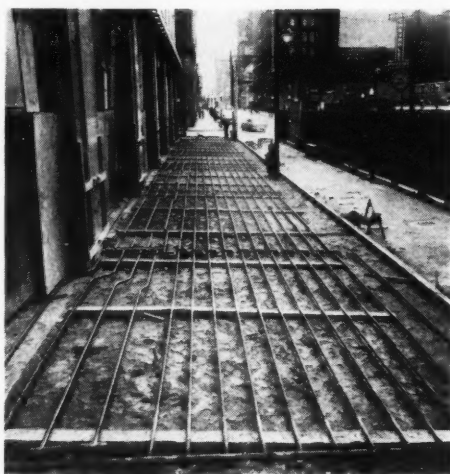
force has remained constant while plant has grown and production increased. Over a period of four years, maintenance overtime has been reduced about 6%.

(Information on preventive maintenance program was supplied by I. G. Sunderman, Head of Maintenance Department, Bakelite Co., Div. of Union Carbide and Carbon Corp., Dept. CP, River Rd., Bound Brook, N.J.)

**Solves problems about blowers and vacuum cleaners**

Along with equipment description, four-page bulletin discusses design and installation services offered by manufacturer. Equipment and services include blowers, exhausters, pneumatic systems, filters, flotation equipment, separators, stills, smooth-flow tubular pipe and fittings, and vacuum cleaners for industrial use.

Bul M-133 is issued by Industrial Division, U. S. Hoffman Machinery Corp., Dept. CP, 103 Fourth Ave., New York 3, N.Y. When inquiring specify 1323 on convenient Reader Service slip opposite last page.



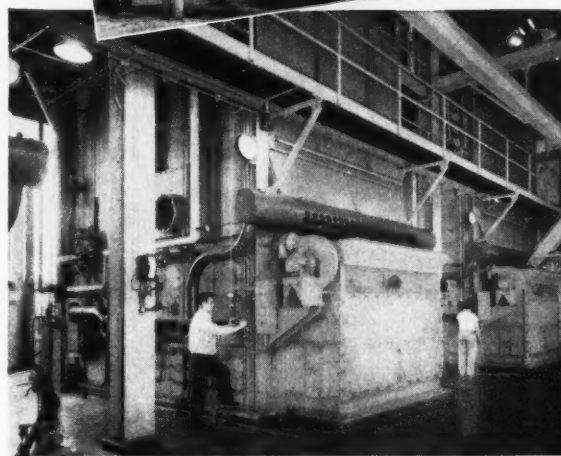
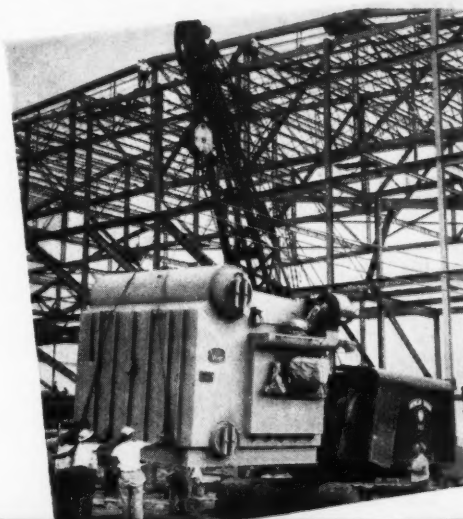
**Saves snow shoveling**

More than 12,000 feet of wrought iron pipe, formed into grids like the one shown, are now beneath a concrete sidewalk around Procter & Gamble Co.'s, Cincinnati office. When snow starts to fall, a heated solution of ethylene glycol will be pumped throughout the system, keeping sidewalk clear.

(Wrought iron pipe is supplied by A.M. Byers Co., Dept. CP, Clark Bldg., Pittsburgh 22, Pa. . . . check 1324 on form opposite last page.)

Look  
for this  
honored

Name Plate . . . a guide to advanced designs  
in package unit and custom built  
steam generating equipment



One of three 15,000 #/hr. capacity package unit steam generators for a State institution.

Two of three 41,000 #/hr. steam generators installed in Medical Center Steam Plant, Louisville, Ky.

Erecting two 50,000 #/hr. steam generators at Kelly Air Force Base, San Antonio, Texas.

Voegt steam generating units are available in types and sizes to meet individual plant needs for power, processing or heating.

Package units range from 10,000 to 40,000 pounds of steam per hour while custom built units are obtainable in the larger capacities. Available in bent tube types and straight tube, forged steel sectional header types for solid, liquid or gaseous fuels burned singly or in combination.

Write for Bulletins, Dept. 24A-BCP

**HENRY VOGT MACHINE CO.**

Box 1918, Louisville 1, Kentucky

**SALES OFFICES**

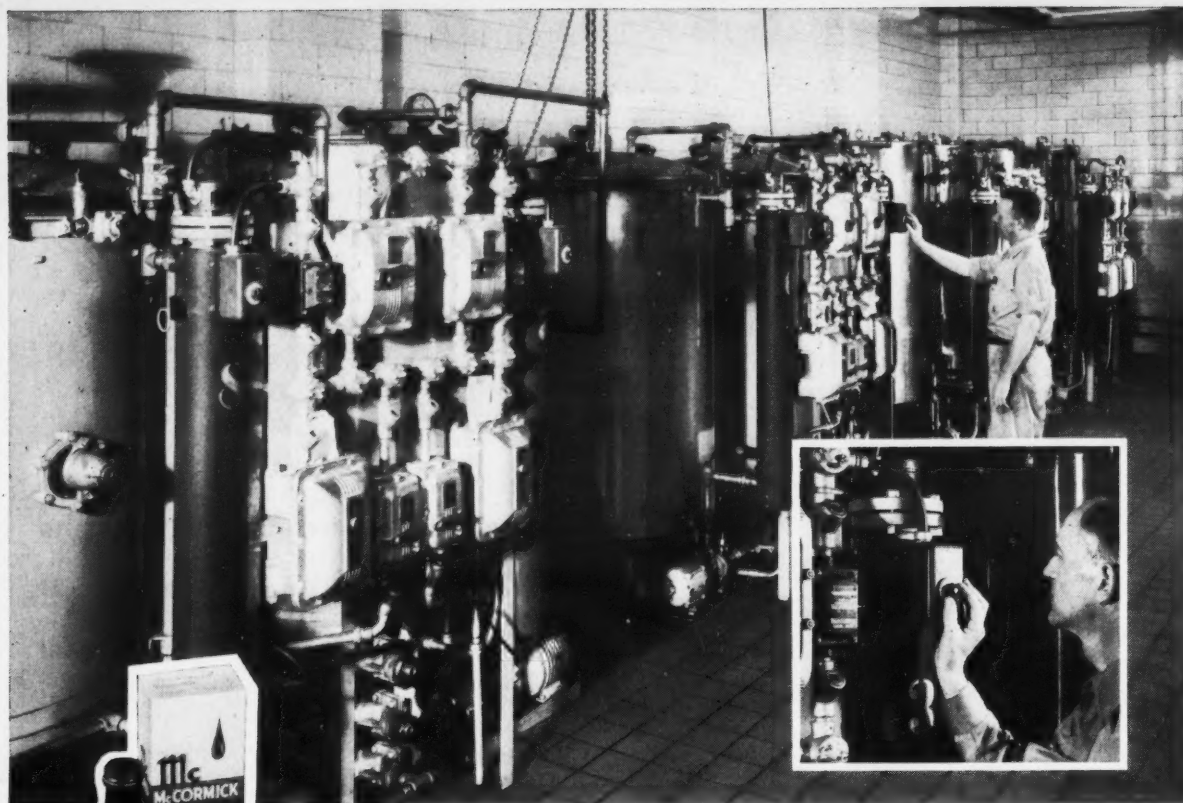
New York, Chicago, Cleveland, Dallas, Philadelphia  
St. Louis, Charleston, W. Va., Cincinnati, San Francisco



**OTHER VOGT PRODUCTS**

Drop Forged Steel Valves, Fittings and Flanges in a complete range of sizes • Petroleum Refinery and Chemical Plant Equipment • Steam Generators • Heat Exchangers • Ice Making & Refrigerating Equipment

When inquiring check 1325 opposite last page



From these McCormick & Company, Inc. percolators, gallons of pure vanilla extract are produced daily. (Inset) Maintenance Supervisor setting the Chromalox Automatic Thermostat to exact degree for optimum extraction.

## Chromalox Electric Heat saves processing time, raises output

Vanilla Extract, as found in every kitchen and soda fountain, is the result of repeatedly passing alcohol through chopped vanilla beans. The process formerly took several days of constant recirculation in the percolators at McCormick & Company, Inc., in Baltimore. Then the company found that processing time could be drastically reduced by mildly preheating the alcohol agent before each contact with the beans.

To overcome the hazard of bringing heat into contact with highly volatile alcohol, McCormick chose and installed a Chromalox Electric Circulation Heater on each of the eight percolators. Results: safe, clean heat, with hairline temperature control; output of equipment was increased and production time reduced. Each part of the heater coming in contact with the circulating

extract was tinned before assembly to maintain the highest purity standards.

Chromalox Electric Circulation Heaters are completely packaged heat exchangers designed for a wide variety of liquid and air heating jobs. You get quick and easy installation—just make several simple pipe and electrical connections. Heating chamber, elements, insulation, thermostats and mounting lugs are built-in.

If your production line heating is a problem, chances are electric heat can do the job better . . . and Chromalox can do it best. We'll be glad to send you helpful information or have a Chromalox sales-engineer give you a personal recommendation. Write for Folder F-1587 containing current application information on versatile Chromalox Circulation Heaters for water, oils, steam, air or heat transfer media.



Vanilla beans, as picked from tropic vines. In the tray, shredded beans ready for processing. The end product, McCormick Pure Vanilla Extract.



**Edwin L. Wiegand Company**

7517 Thomas Boulevard • Pittsburgh 8, Pa.

When inquiring check 1326 opposite last page

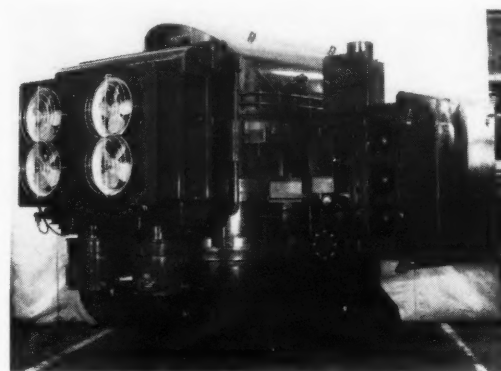
## ENGINEERING & MAINTENANCE

**Lighter, safer, quieter transformers  
now possible using SF<sub>6</sub> gas  
to replace oil . . .**

gas is non-toxic, non-flammable, and stable, will transmit less core noise

Lighter weight, greater safety, and quieter operation are benefits obtained with transformer that is insulated and cooled by gas rather than oil. Gas, sulfur hexafluoride, is stable, non-toxic, and non-flammable, is an excellent electrical insulator and heat transfer medium.

A 10,000-kva, gas-filled unit weighs about 2000 lb less than an equivalent oil-filled unit.



Gas-filled transformer is rated at 2000 kva, 69,000 to 480 volts

Possible fire hazards which may exist with oil-filled transformers are greatly reduced with non-flammable gas insulation. Gas is compressible, materially lessening likelihood of dangerous pressures building up inside tank in event of an interior fault.

Noise and hum, originating in steel core, are not transmitted through gas as readily as through oil to the outside air.

First of the units, rated 2000 kva, 69,000 to 480 volts, was recently supplied to Consolidated Edison Co. of New York City. Gas is sealed in transformer at a pressure of 30 psi and is forced through steel core and copper coils. It absorbs heat from core and coils and gives up heat to outside air through fan-cooled radiators mounted on side of transformer.

Development of gas-filled unit makes possible interior installations of transformers rated at more than 15,000 volts, the current upper limit for dry-type units required by underwriters for all interior locations.

(Gas-filled transformer is a product of Power Transformer Dept., General Electric Co., Dept. CP, Pittsfield, Mass. . . or for more information check 1327 on form which is located opposite last page.)

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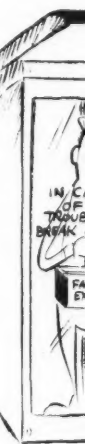
Uses:  
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Features



Hand di  
pump  
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1328 on





**Dispenses material directly  
from drum without racking,  
saves floor space . . .**

pump delivers four ounces at each stroke,  
will not corrode

**Uses:** Dispensing soaps, detergents, disinfectants, waxes, liquid fertilizers, boiler chemicals, or similar material from upright drums.

**Features:** Hand pump dispenses exactly 4 ounces at each stroke. It eliminates drum racking, saves floor space, and leaves drum always easily accessible. Steel and chrome plated construction prevents corrosion or reaction with pumped material.

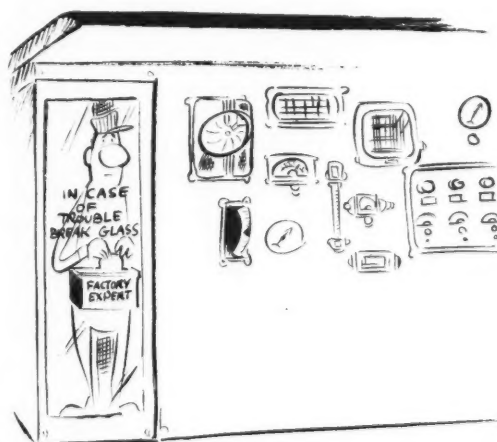


Hand dispensing pump fits any drum from 15 to 65 gallons

**Description:** Unit is designed to fit standard  $\frac{3}{4}$ " opening on all size drums from 15 to 65 gallons. It is self-venting. Specially designed handle provides locking arrangement to eliminate misuse of drum's contents.

(Dispensing pump is a product of Multi-Meter Corp., Dept. CP, PO Box 154, West Toledo Station, Toledo 12, Ohio . . .

or for more information reader may simply check 1328 on form opposite last page.)



*Glocke*

**OUTSTANDING  
CHEMICAL PROPERTIES**

**OUTSTANDING  
PHYSICAL PROPERTIES**

**VISTEX\* with TEFLON\*\*  
Gasketing Material**

**DEFINITE  
ECONOMICAL ADVANTAGES**

Another first for American! The exceptional thermal and chemical properties of Teflon are combined with low, cold flow characteristics to give you a gasketing material never before available.

With thermal stability up to 420F. Vistex with Teflon eliminates undesirable lateral plastic flow with excellent stability to corrosive gases, liquids and virtually all chemicals at low and high temperatures.

Vistex with Teflon, with tensile strength of 5,000 psi, has very high tear value, will not ravel or fray, has very good cutting properties. Seals with minimum pressure on polished or irregular surfaces.

American's engineering and research staff is prepared to supply you with complete data and product recommendations. Write today on your company letterhead.

\*VISTEX—Reg. Trade-mark of American Felt Company  
\*\*TEFLON—Reg. Trade-mark of DU PONT for its Tetrafluoroethylene resin.

**American Felt  
Company**  
TRADE MARK

GENERAL OFFICES:  
96 GLENVILLE ROAD,  
GLENVILLE, CONN.

SALES OFFICES: New York, Boston, Chicago, Detroit, Cleveland, Rochester, Philadelphia, St. Louis, Atlanta, Greenville, S. C., Dallas, San Francisco, Los Angeles, Portland, San Diego, Seattle, Montreal.—PLANTS: Glenville, Conn.; Franklin, Mass.; Newburgh, N. Y.; Detroit, Mich.; Westerly, R. I.—ENGINEERING AND RESEARCH LABORATORIES: Glenville, Conn.

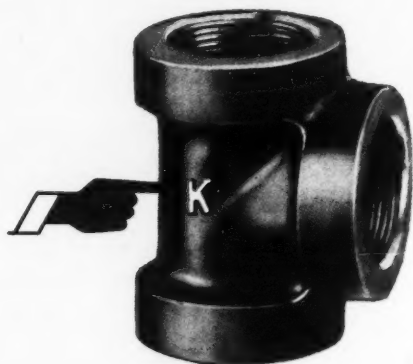
When inquiring check 1329 opposite last page

YOU CAN

SEE



IT'S A GOOD FITTING



### The "K" means fine workmanship

Looking at a "K" cast-iron pipe fitting, you'll see the smooth walls inside and out . . . the clean, sharp threads . . . the accurate machining. But many factors of a "K" fitting are not visible on the surface. They are the close grain and tensile strength and even thickness of the metal . . . the freedom from porosity, impurities, and defects.

"K" fittings *have* to be right. We don't make anything else. So our business success depends upon making fittings which keep our customers satisfied.

Many piping contractors and maintenance engineers insist upon getting "K" fittings from suppliers. It's a smart thing to do.

You are invited to ask for our condensed catalog.

**THE KUHNS BROTHERS CO.**  
1800 McCALL ST. • DAYTON 1, OHIO  
*Established 1887*

When inquiring check 1336 opposite last page

## ENGINEERING & MAINTENANCE

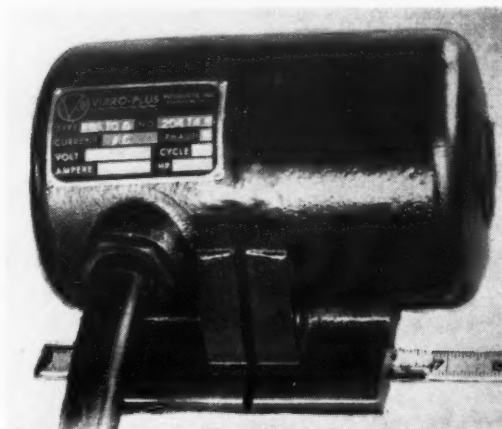
### Impact of up to 275 lb delivered by 25-lb bin vibrator . . .

unit is quiet in operation, can be either fixed or portable

**Uses:** Vibrator is designed for use on bins, hoppers, screens, or chutes to speed flow of material.

**Features:** Unit weighs only 25 lb but will deliver an impact of 275 lb with no more noise than normally made by an electric motor. It can be furnished with provision for either fixed or portable mounting.

**Description:** Vibrator can be preset for out-



Bin vibrator can be furnished with provision for either fixed or portable mounting

puts of 53, 80, 106, 160, 213, or 240 lb of impact. A range of voltages from 110 to 550 with one-, two-, or three-phase current is available.

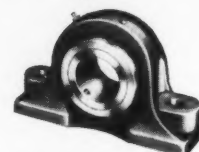
(ER-100 bin vibrator is a product of Vibro-Plus Products, Inc., Dept. CP, Stanhope, N. J. . . . or for more information check 1337 on the convenient Reader Service slip which is located opposite last page.)

### Hollow aluminum bar stock detailed in 8 pages

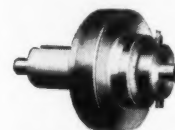
Technical brochure contains full details on hollow aluminum bar stock including tolerances, mechanical properties, and applications. Case studies and comparison charts demonstrate machining performance. Tables give standard sizes of round and hexagonal stock together with wall thicknesses, dimensions, and weight per foot.

"Hollow Aluminum Bar Stock" is issued by Harvey Aluminum, Dept. CP, 19200 S. Western Ave., Torrance, Calif. When inquiring specify 1338 on the convenient Reader Service slip which is located opposite last page.

## DODGE PRODUCTS you should know



**SC and SCM  
BALL BEARING  
PILLOW BLOCKS**



**DIAMOND D  
CLUTCHES**



**SEALED-LIFE V-BELTS**

### DODGE BULLETINS YOU SHOULD HAVE

- ☒ **ROLLING BEARINGS.** Load ratings, dimensions and other data on Dodge-Timken and SC and SCM Ball Bearings. Bulletin A638.
- ☒ **CLUTCHES.** Diamond D, Rolling Grip and Air-Grip Clutches. Technical data, sizes and selection tables. Bulletin D56.
- ☒ **SEALED-LIFE V-BELTS.** Construction details and complete data on sizes, pitch lengths and outside lengths. Bulletin A 606.

Write for your copies.

DODGE MANUFACTURING CORPORATION  
6200 Union Street • Mishawaka, Indiana

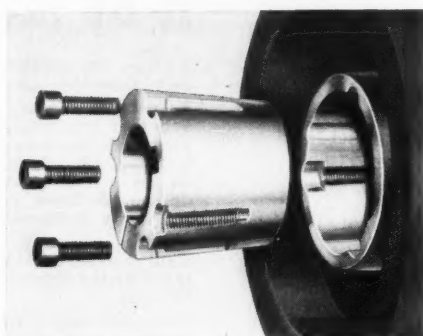
**DODGE**  
of Mishawaka, Ind.

CHEMICAL PROCESSING



# 68

**LEADING MANUFACTURERS  
ARE LICENSED BY DODGE TO  
MANUFACTURE TAPER-LOCK HUBS  
FOR USE IN THEIR PRODUCTS OR PLANTS**



## TAPER-LOCK

The Taper-Lock method of mounting wheels to shafts has been adopted as standard in thousands of plants. With 68 licensees incorporating Taper-Lock in their products, such standardization is becoming more and more universal... The Taper-Lock bushing mounts flush. No flange, no collar, no protruding parts. Easy on, easy off. Taper-Lock holds with the firmness of a shrunk-on fit. ONE bushing fits sprockets, sheaves, couplings and pulleys—both timing-belt and conveyor... See your Dodge Distributor or write us for the full story.

**DODGE MANUFACTURING CORPORATION**  
6200 Union Street, Mishawaka, Indiana

**DODGE**  
of Mishawaka, Ind.

**MANUFACTURER OF MODERN POWER TRANSMISSION MACHINERY  
AND ORIGINATOR OF TAPER-LOCK**

### TAPER-LOCK LICENSEES

The Air Preheater Corp., New York  
Ajax Flexible Coupling Co., Inc., Westfield  
American Can Co., Pacific Div., San Francisco  
American Machine and Metals, Inc., East Moline  
Sub. Cos. Bethlehem Steel Corp., Bethlehem  
The Black-Clawson Co., Middletown  
The Brewster Co., Inc., Shreveport  
Chain Belt Company, Milwaukee  
Chicago Pneumatic Tool Co., New York  
The Cleveland Worm & Gear Co., Cleveland  
Cocker Machine & Foundry Company, Gastonia  
Colman-Cuveller, Lille, France  
Continental Can Co., Inc., New York  
Crucible Steel Co. of America, Pittsburgh  
Dexter Folder Company, Pearl River  
Diamond Chain Co., Inc., Indianapolis  
The Duraloy Company, Scottsdale  
Ericsson Merrill, Inc., Lockport  
Fairmont Railway Motors, Inc., Fairmont  
J. H. Fenner & Co., Ltd., Marfleet, England  
J. H. Fletcher & Co., Huntington  
Foremost Machine Builders, Livingston  
The Fuller Brush Co., Hartford  
The Goodman Mfg. Co., Chicago  
Gould Paper Co., Lyons Falls  
Hammond Laundry Cleaning Mach. Co., Waco  
Hetherington and Berner Inc., Indianapolis  
Humphrey and Sons Co., Joliet  
Illinois Gear & Machine Co., Chicago  
Imperial Paper and Color Corp., Glens Falls  
Industrial Specialties Co., Pawtucket  
Iowa Manufacturing Co., Cedar Rapids  
The Jeffrey Manufacturing Co., Columbus  
Jones Machinery Division,  
Hewitt-Robins Inc., Chicago  
Kallay Gear Works, Inc., Bridgeport  
The Karl Kiefer Machine Co., Cincinnati  
Keyes Fibre Company, Waterville  
Lamson Corporation, Syracuse  
E. P. Lawson Co., Inc., New York  
Link-Belt Company, Chicago  
The Long Company, Oak Hill  
Loper Machine Works, Monroe  
Lavejoy Flexible Coupling Co., Chicago  
J. W. Minder Chain & Gear Co., Los Angeles  
Morse Chain Company, Detroit  
Niagara Chemical Division,  
Food Machinery & Chemical Corp., Middleport  
Oil Well Supply Division,  
United States Steel Corp., Dallas  
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Potter & Johnston Co., Pawtucket  
Prager Incorporated, New Orleans  
Proctor & Schwartz, Inc., Philadelphia  
Ramsey Chain Company, Inc., Albany  
Robert Reiner, Inc., Weehawken  
R. J. Reynolds Tobacco Co., Winston-Salem  
St. Regis Paper Company, New York  
Shenango-Penn Mold Co., Dover  
Sonnag Scientific Corporation, Greenwich  
Standard Steel Spring Div., New Castle  
Stranahan Gear Co., Inc., Philadelphia  
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The Waterman-Western Company, Exeter  
Webster Manufacturing, Inc., Tiffin  
Whitewater Manufacturing Co., Whitewater  
The Whitney Chain Company, Hartford

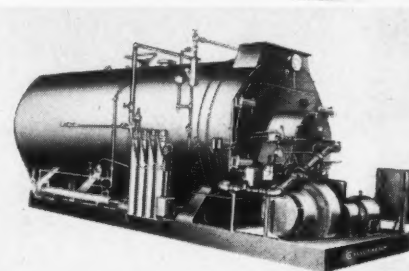
### ENGINEERING & MAINTENANCE

**750 hp package steam generator  
delivers 26,000 lb steam/hr  
at over 80% efficiency...**

combines all the advantages of a packaged unit with high steaming capacity

**Uses:** Generating steam. Unit is designed to burn heavy oil or gas and can be adapted to burn either LP-Gas or light oil.

**Features:** Package steam generator will deliver 26,000 lb steam per hr at over 80% efficiency. It combines all advantages of package steam gen-



Package Steam Generator is 28' x 9'6" x 10'8"

erators (high efficiency, compact size, inexpensive installation) with steaming capacities formerly associated exclusively with custom-erected units. Generator is rated at 750 hp.

**Description:** Over-all dimensions are: 28' x 9'6" x 10'8". Modulation over a wide range permits guarantee of efficiencies of 80% (or better) down to a small fraction of the rated 750 hp capacity.

(Cyclotherm C-26,000 is a product of Cyclotherm Division of National-U.S. Radiator Corp., Dept. CP, Oswego, N.Y. . . . or for more information check 1340 on form which is located opposite last page.)



**Right down your alley!**

You and other key processing people like you are hand-picked to receive **CHEMICAL PROCESSING**. It's edited for you alone . . . sent to you without subscription charge.

How does this benefit you?

See page 93

When inquiring check 1339 opposite last page

# PVC PLASTIC PIPE COMES OF AGE



**INSTALLED...OVER A MILE OF ALPHA RIGID PVC PIPE  
REPLACED...OVER A MILE OF PIPE CORROSION HEADACHES**

Process piping that won't corrode or introduce contaminants into the product is a must at the Reheis Company, Berkeley Heights, N. J., producer of fine bulk chemicals for the pharmaceutical and cosmetics industries. That's why Reheis installed a PVC package which includes:

1. 6200 feet of Alpha rigid PVC pipe.
2. 4930 Alpha PVC fittings.
3. 180 Alpha PVC valves.

There are a number of reasons why Alpha PVC has come of age at Reheis and other plants in the chemical process industries.

- **Corrosion Resistance**—Alpha PVC is inert to attack by the widest range of acids and alkalis of any material in the moderate price class.
- **Low Cost**—Alpha PVC package systems including pipe, valves and fittings, average less than half the cost of stainless steel.
- **Ease of Installation**—Only one-half the weight of aluminum, PVC pipe is assembled with cemented, screwed, flanged or welded joints.
- **Low Maintenance**—The corrosion resistance and high impact of PVC assures minimum maintenance.
- **Availability**—A large stock of pipe, valves and fittings up to 4 inches is available for immediate delivery.

For preventive maintenance, replace worn out piping systems with Alpha PVC and end your corrosion headaches.

Send for detailed literature on Alpha's line of PVC pipe, valves and fittings. Better still, contact our engineering advisory service. This service is available, at no obligation, to help solve your corrosion problems.

**ALPHA PLASTICS INC.** OKNER PARKWAY • LIVINGSTON, NEW JERSEY

INDUSTRIAL DISTRIBUTORS: territories available for Alpha's line of PVC pipe, valves and fittings.

When inquiring check 1341 opposite last page

## ENGINEERING & MAINTENANCE

**Sump pump is light weight,  
operates with a maximum  
head of 95 ft . . .**

bronze unit handles acid or corrosive liquids

**Uses:** Removing water or other liquids from tanks, sumps, manholes, or traps.

**Features:** Sump pump is rated at 340 gpm against a 10-foot head. It is available in either



Sump pump is rated at 340 gpm against a 10-foot head

steel (weight 56 lb) for standard applications, in bronze (75 lb) for use in pumping acid or corrosive liquids. Pump operates with a maximum head of 95 feet.

**Description:** Unit has a base diameter of eight inches and is 23" high. Air-operated motor is governor controlled and has a built-in lubrication

system. Pump requires no priming. Air inlet is 3/4" in diameter, discharge outlet is 2 1/2" in diameter.

(Air Operated Sump pump is a product of Le Roi Div., Westinghouse Air Brake Company, Dept. CP, Milwaukee, Wis. . . . or for more information check 1342 opposite last page.)

**Combines air conditioning vent  
and light fixture for reduced  
installation cost . . .**

single unit performs job that formerly required two separate units

**Uses:** Ceiling fixture provides both air distribution and lighting for offices, factories, laboratories, or other installations.

**Features:** Combination lighting fixture and air diffuser performs a job that formerly required two separate units. Estimated cost is approximately \$1.60/sq ft as compared to \$2.00/sq ft for separate lighting and air-conditioning systems. This does not include additional saving in labor costs realized by using one unit instead of two. Air emerges gently down from fixture in a manner compared to fine spray from a hose nozzle.

**Description:** Unit is a regular recessed fluorescent light fixture with a built-in air diffuser, mounted above the reflector plate, to distribute air which bypasses the lamps. Fixtures, called



**2  
if by machine**

Alconox the world famous hospital and laboratory detergent now has a twin brother.

Whether you wash your delicate glassware, instruments and equipment by hand or by machine, we have the product that will do the job faster, better and safer than any detergent now on the market.

Paul Revere's message was dictated by the signal from Old North Church.

Your decision is dictated by the washing method your laboratory uses.

**ALCONOX for all  
equipment washed by hand:**

**ALCOJET for all  
equipment washed by machine:**

Alconox available in:	
Box of 3 lbs.—price	\$ 1.95
Carton (12 boxes of 3 lbs.)	18.00
Drum of 25 lbs.	lb. .45
Drum of 50 lbs.	lb. .40
Drum of 100 lbs.	lb. .40
Barrel of 300 lbs.	lb. .37
(slightly higher on West Coast)	

Alcojet available in:	
Box of 5 lbs.—	\$ 3.00
Case (6x5 lbs.)	15.00
Drum of 25 lbs.	lb. .45
Drum of 50 lbs.	lb. .42
Drum of 100 lbs.	lb. .40
Drum of 300 lbs.	lb. .37
(slightly higher west of the Rockies)	

**Order from your favorite supplier  
or write for literature and samples.**

**ALCONOX Inc.**  
61-43 CORNELISON AVE., JERSEY CITY 4, N.J.

When inquiring check 1343  
opposite last page

CHEMICAL PROCESSING

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Vent-fixture combination cuts labor costs

Troffers, are available in three types: Louvered troffers for use where good general distribution of light with excellent shielding is desired; Baffled troffers for high levels of illumination, uniformity of light, and minimum shadows; Open troffers where shielded light sources are not a consideration. Flexible four-inch diameter tubing connects troffer with air ducts above the ceiling.

(Multi-Vent Troffer is available from Pyle-National Co., Dept. CP, 1334 N. Kostner, Chicago 51, Ill. . . . or for more information check 1344 on form opposite last page.)

**Slope control gives a softer arc  
in constant voltage welding  
with modified unit . . .**

adjustable control eliminates erratic welds due to high current surges

**Uses:** Welding aluminum, stainless steel, and other alloys in all semi-automatic and all metallic-arc automatic processes.

**Features:** Modified constant voltage welder has an adjustable slope control that gives a softer arc, eliminates burn-back and possibility of erratic welds due to high current surges.

**Description:** When properly adjusted machine provides a stable, spray-type deposit. It is available in 300-, 500-, 750-, and 1200-amp sizes.

(P&H Modified Constant Voltage Welders are available from Harnischfeger Corp., Welding Div. 4400 W. National Ave., Dept. CP, Milwaukee 1, Wis. . . . or for more information check 1345 on form opposite last page.)

Your guide . . . to more Engineering & Maintenance ideas and equipment is the alphabetical product directory on page 217

## BALDWIN-HILL Mono-Block

helps cut down maintenance time on Esso Standard Oil Catalytic Cracker No. 1 at their Bayway Refinery

- The light weight, ease of handling, cutting and shaping speeds application of B-H Mono-Block.
- This one block covers the full range of temperatures up to 1700° F. No need for two insulating blocks for low and high temperatures.
- "Waffle" surface helps application of B-H Super Powerhouse insulating-finishing Cement without use of wire mesh base.
- Felted structure yields to surface projections and irregularities; easily impaled on studs.

### BALDWIN-HILL COMPANY

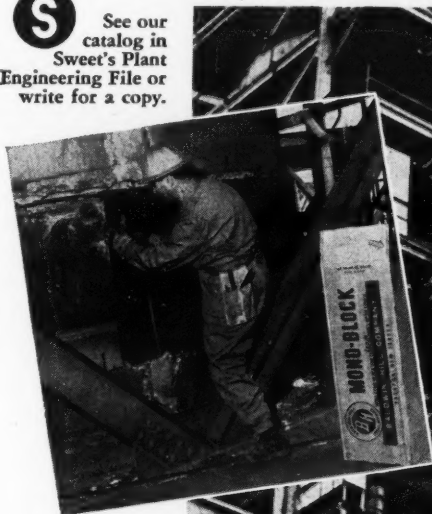
401 Breunig Avenue, Trenton 2, N. J.

Huntington, Ind.

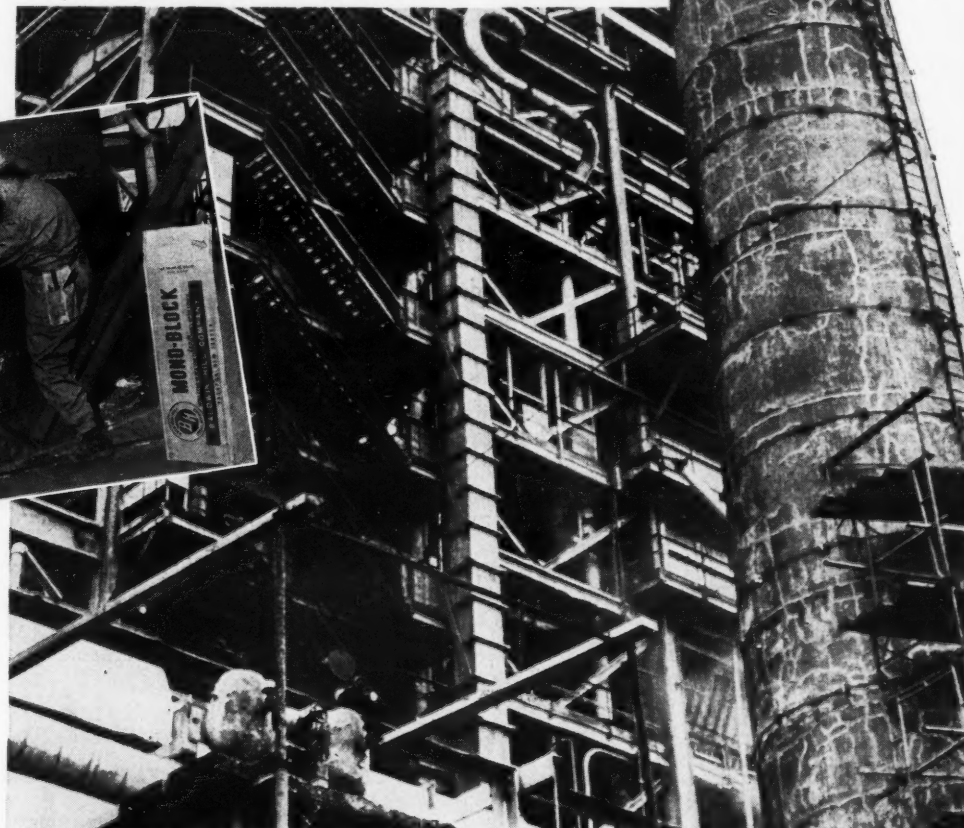
Kalamazoo, Mich.

Temple, Texas

**S** See our catalog in Sweet's Plant Engineering File or write for a copy.



B-H Mono-Block in thicknesses from 1" to 4" applied to high temperature lines 14" diameter or over and to high temperature vessels. Finally coated with B-H Super Powerhouse insulating-finishing Cement.



#### COMPLETE LINE OF BALDWIN-HILL INSULATING PRODUCTS

B-H Mono-Block  
B-H Blanket  
B-H Koldboard  
B-H Bond-Tite  
B-H Weatherseal

B-H Super Powerhouse Cement  
B-H No. 1 Insulating Cement  
B-H No. 52 Asbestos Cement  
B-H Spun Felt Insulation  
B-H Fine-Fyber Felt Insulation

B-H No. 100 Pipe Insulation  
B-H 85% Magnesia Pipe Insulation  
B-H Calcium Silicate Pipe Insulation  
B-H Mono-Kover Pipe Insulation  
B-H Spun Mineral Wool Fill

When inquiring check 1346 opposite last page

# Would you like to receive CHEMICAL PROCESSING personally?

It will be sent to you  
without charge or  
obligation . . .

. . . if you qualify  
. . . if you request it

If you are responsible for processing operations in an administrative capacity as plant superintendent, chemical engineer, chemist, engineer or equivalent responsibility . . . in a plant of substantial operations\* where chemical processing is an important factor . . . CHEMICAL PROCESSING will be sent to you without charge or obligation if you request it. Use form below. In requesting, be sure to answer all questions. If your firm is not rated or listed in standard references, indicate size of the company by capacity, annual sales or number of employees. Unless all information is given, magazine will not be sent.

\*"Substantial operations" does not necessarily mean an extremely large plant. But requests for the magazine exceed supply so we must get standards to insure publication being sent where it can be used to best advantage.

CHEMICAL PROCESSING  
111 EAST DELAWARE PLACE  
CHICAGO 11, ILLINOIS

Please send me CHEMICAL PROCESSING without charge or obligation

Name .....

Title .....

Company .....

Rating of Company .....

Street .....

City ..... Zone .....

State .....

Main Products .....

## ENGINEERING & MAINTENANCE

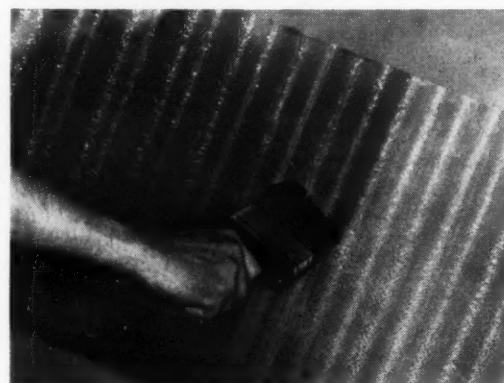
### Luster given to glass fiber dulled or roughened by weathering . . .

air-drying liquid lacquer can also be used to  
deepen plastic's color

**Uses:** Restoring most of original lustre and finish to glass fiber which may have become dull or roughened by long exposure to the elements.

**Features:** Coating dries to a smooth lustrous finish. Its color has approximately the same weathering characteristics as that of original panel and it may be used to deepen the color, reducing light and heat transmission.

**Description:** Product is an air-drying liquid lacquer composed of special resinous materials. It will not peel, crack, or chip. It is available clear and in seven colors: light and dark blue, light and dark green, coral, yellow, and white. A gallon



Coating weathers as well as original panel

covers approximately 400 sq ft at a cost of approximately \$0.025/sq ft. Resolac can be applied either with a low-pressure spray gun or ordinary paint brush. A clean, dry surface is the only preparation needed for application. The surface to be covered can be washed with any mild detergent or with regular lacquer thinner.

(Resolac is a product of Resolite Corp., Dept. CP, Zelenpole, Pa. Check 1348 opposite last page.)

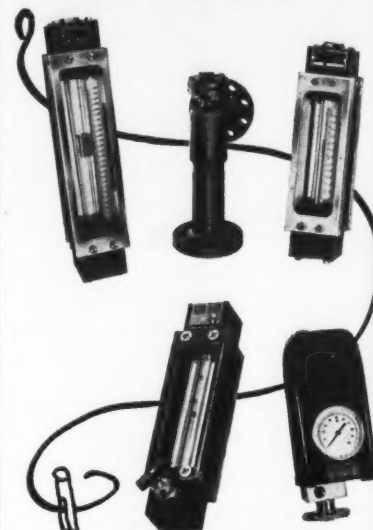
### Tells about diaphragm slurry pump

Two-color, six-page bulletin utilizes photographs, wash and line drawings, and graphs to detail features, applications, capacities, and power requirements of diaphragm slurry pump. A complete breakdown of pump's operating parts is given together with dimensional data.

Bul 5003 is issued by Dorr-Oliver Inc., Dept. CP, Barry Place, Stamford, Conn. When inquiring specify 1349 on form opposite last page.

## BROOKS LEADERSHIP achieved through design

### ROTAMETERS

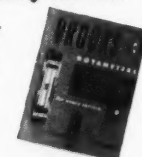


### a FULL LINE for every service

Whatever your flow measurement or remote transmission needs . . . Brooks has the answer. Moreover, it is a *practical* answer . . . because the same practical design features are carried through the line. From Hi-Accuracy Flow Indicators to low-cost purge meters . . . from the well-known Ar-Met Armoured Meter to the new convertible electric or pneumatic flow transmitters, you'll find these common features: self-alignment of essential parts, simplified cleaning and assembly, and designs that eliminate troublesome line strain on the metering elements.

You can depend on Brooks rotameter equipment for *lowest final cost* all down the line—because it has been performance-proven where it counts most: in daily service.

Send for your copy of  
Bulletin 110b, a brief,  
well illustrated guide  
to Brooks Rotameters  
and Accessory  
Equipment.



### BROOKS ROTAMETER COMPANY

157 A Street, Lansdale, Pa.

the new standard of  
flow measurement  
and control

When inquiring check 1350  
opposite last page

CHEMICAL PROCESSING

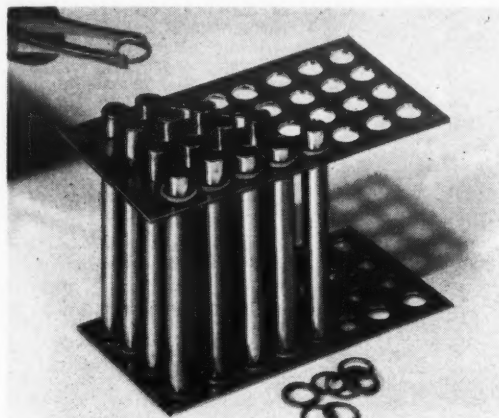


**For uniformly sound brazed joints  
on stainless tubular assemblies:  
prefabricated brazing rings . . .**

they eliminate waste and reduce assembly time up to 85%

**Uses:** Rings are to be used in fabricating stainless tubular assemblies of all kinds.

**Features:** Prefabricated brazing rings assure application of a uniform thickness of brazing alloy



Brazing rings are slipped over tubing, provide uniform thickness of brazing alloy at every joint

at every joint. Uniformly sound brazed joints are achieved, waste is eliminated, and assembly time reduced up to 85%.

**Description:** Available in alloy grades to suit any need, rings can be made for use with all standard or special tube sizes or shapes. They are produced accurately to individual specifications with dimensional tolerances within 0.001". Rings are designed to slip over tube to be brazed, thus simplifying and speeding up fabrication.

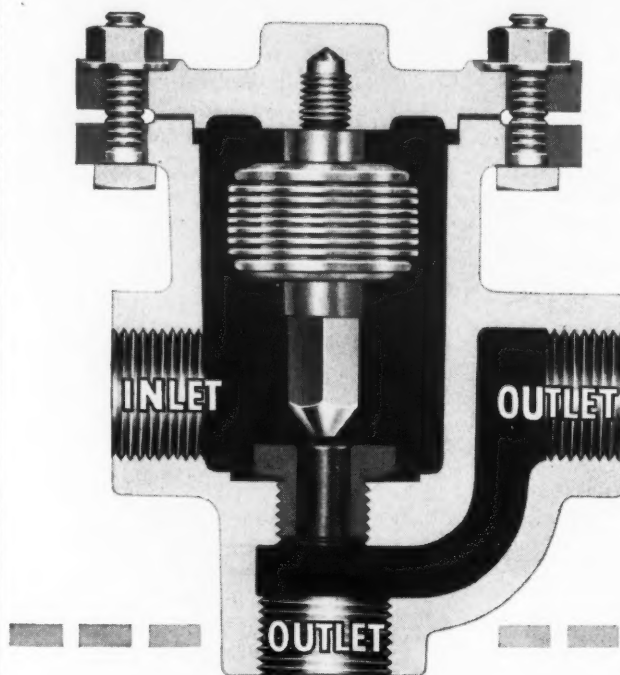
(Prefabricated Microbraz Brazing Rings are product of Stainless Processing Div. of Wall Colmonoy Corp., Dept. CP, 19345 John R Street, Detroit 3, Mich. Check 1351 on form opposite last page.)

**Gives facts and figures  
on expansion joints**

Catalog of 72 pages covers design, manufacture, and application of packless, corrugated, expansion joints. Tables and charts give complete engineering specifications. A selection chart tells how to choose correct expansion joint for a given set of conditions.

Cat 56 is available on letterhead request to Zallea Brothers, Dept. CP, 895 Locust St., Wilmington 99, Del.

# FITS TO A



## ... WHERE THESE DRAINAGE PROBLEMS EXIST:

1. FREQUENT SHUTDOWNS  
AND STARTUPS.
2. LARGE AMOUNTS OF AIR.
3. DANGER OF FREEZEUP.

### FACTS ON THE SERIES "T" THERMOSTATIC TRAP

- Cast semi-steel construction suitable for steam pressures from 0 to 250 psi and temperatures up to 450° F.
- Inlet and outlet connections 1/2" to 2".
- Optional angle or straight-through piping.
- Freeze proof when using vertical outlet.
- Bronze or monel bellows.
- Other Clark Thermostatic Traps are available in bronze and cast steel.

### FREE BROCHURES ALSO AVAILABLE ON THESE CLARK FLUID CONTROLS

INVERTED BUCKET TRAPS  
OPEN BUCKET TRAPS  
FLOAT TRAPS  
VENTING TRAPS

VACUUM TRAPS  
PRESSURE REGULATORS  
PRESSURE REDUCING VALVES  
Y-TYPE STRAINERS

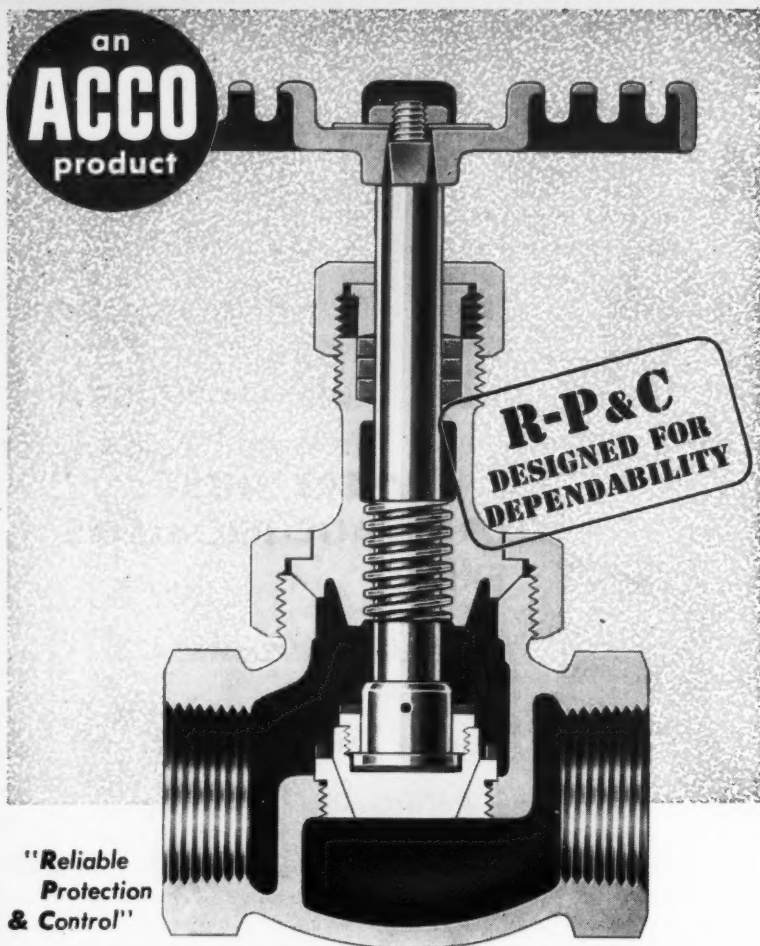
Clark Series "T" Thermostatic Traps are specially designed to drain condensate from steam lines under unusual conditions where other traps lose their drainage efficiency. They operate on the basis of the temperature differential between steam and condensate.

This new series of traps round out an already broad line of industrial traps — inverted bucket — open bucket or float actuated. There is no so-called "universal" trap and the Clark organization is now in a position to meet the various special drainage requirements.

Send now for your free brochure giving detailed technical information on Clark Thermostatic Traps.

THE **Clark** **ENGINEERED**  
**Fluid Controls**  
**FOR DRAINAGE OR REGULATION**  
**MANUFACTURING COMPANY** 1830 EAST 38TH STREET  
CLEVELAND 14, OHIO

When inquiring check 1352 opposite last page



## New R-P&C Bronze Globe Valve

- STAINLESS STEEL SEAT AND DISC (500 BRINELL)
- FULL-PLUG FOR CLOSER REGULATION, LONGER LIFE

R-P&C's new Fig. 427-DP bronze globe valve is recommended for steam, water, oil and gas service where control or regulation of flow is required. Its 500 Brinell stainless steel seat and disc resist wire-drawing—make it particularly suitable for continuous throttling and other severe applications.

- The Fig. 427-DP is packed with the quality features that users expect from R-P&C. For example, the union bonnet for added strength and convenience, and a disc and seat ring construction which permits regrinding without removing the valve from the line. The full-plug construction, with its exceptional wide seating surface, gives closer control, longer life.

- The Fig. 427-DP is rated for 300 lbs. Steam—1000 lbs. owg in sizes ¼" to 2", and 600 owg in sizes 2½" and 3". Also supplied as an angle valve. Precisely designed, it is a fitting addition to R-P&C's complete line of bronze valves—gates, globes, angles and checks, in pressure classes from 125 to 300 lbs. See your R-P&C Distributor or write for catalog.

**ACCO**



**R-P&C Valve Division  
AMERICAN CHAIN & CABLE**

Reading, Pa., Atlanta, Boston, Chicago, Denver, Detroit,  
Houston, New York, Philadelphia, Pittsburgh, San Francisco,  
Bridgeport, Conn.

**R-P&C  
valves**

When inquiring check 1353 opposite last page

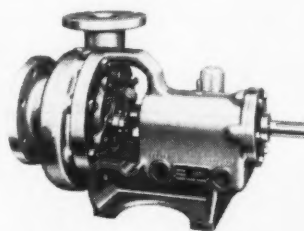
## ENGINEERING

**Pump can be changed  
for new conditions  
economically . . .**

interchangeability of parts  
cuts inventory needed

**Uses:** Pumping chemical process liquids, either hot or cold, in moderate capacities against low, medium, or high heads.

**Features:** Interchangeability of components enables user to



Pump will handle liquids at temperatures up to 400°F

change impeller, back plate, volute case — and "build" proper pump for intended service.

**Description:** Units are available in discharge sizes from 1 through 4" with open or closed impellers. Capacities up to 800 gpm against heads to 400 ft can be supplied. Two types, DL and DM, allow pumping of fluids at temperatures up to 400°F.

(Types DL and DM pumps are available from Peerless Pump Div., Food Machinery and Chemical Corp., Dept. CP, 301 W. Avenue 26, Los Angeles 31, Calif. . . . or for more information check 1354 opposite last page.)

**Gives facts on anchoring  
precision machines**

Pocket-size, 6 x 9", folder gives installation facts of using company's vibration absorbing material to mount precision machines.

"Facts About Anchoring Precision Machines" is issued by The Felters Co., Dept. CP, 210 South St., Boston 11, Mass. Specify 1355 opposite last page.

## GASKETS · SHIMS WASHERS

**From 1 to 1 Million**

No matter what type, thickness, shape or quantity required, you can count on Chicago-Wilcox for uniformly accurate gaskets, shims, washers or special stampings.

With 50 years accumulation of dies, chances are we can furnish just what you need without a die charge—thus reducing costs substantially and assuring on-schedule delivery.

Gaskets, shims and washers can be supplied in metallic, non-metallic and plastics . . . teflon, nylon, etc. . . and in quantities to meet your production requirements.

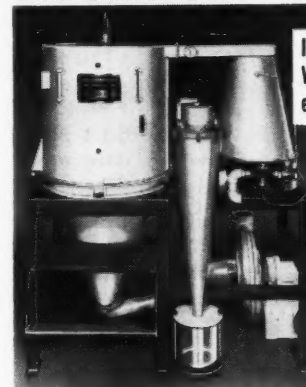
Write for catalog and submit your specifications for quotation.

**CHICAGO-WILCOX MFG. CO.**

7717 South Avalon,  
Chicago 19, Illinois

When inquiring check 1356 opposite last page

## BOWEN CONICAL LABORATORY SPRAY DRYER



Interchangeable Nozzle or  
Wheel Atomization provides  
extreme operating flexibility

**CAPACITY**  
15 to 80 lbs/hr  
water evaporation  
depending on inlet  
temperature and  
product drying  
rate

The New Bowen Conical Laboratory Spray Dryer has been especially designed for economical product evaluation and production of limited quantities of valuable materials. Particular attention has been given to operating features and ease of cleaning. Surfaces in contact with feed material and product are stainless steel throughout. Drying temperatures are variable up to 1000°F to accommodate a wide variety of materials. Fully described in Bulletin 34. Send for your copy.

The new unit can be seen in operation, by appointment, at the Bowen Laboratory in North Branch.

**BOWEN SPRAY DRYERS**  
Always Offer You More!

**BOWEN  
ENGINEERING,  
INC.**

North Branch 1, New Jersey

When inquiring check 1357 opposite last page

CHEMICAL PROCESSING

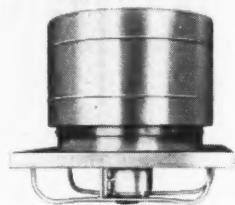


**Pivoting aluminum damper blades  
on roof ventilator keep out  
rain and snow . . .**

unit can be equipped with a fire safety device which automatically opens dampers

**Uses:** Exhausting fumes, smoke, and other vapors from industrial buildings.

**Features:** Aluminum damper blades on roof ventilator open wide with minimum fan pressure and close tightly, when unit is not operating, to keep out rain and snow. Damper blades can be equipped with a fire safety device which opens them automatically when subjected to intense heat. Smoke



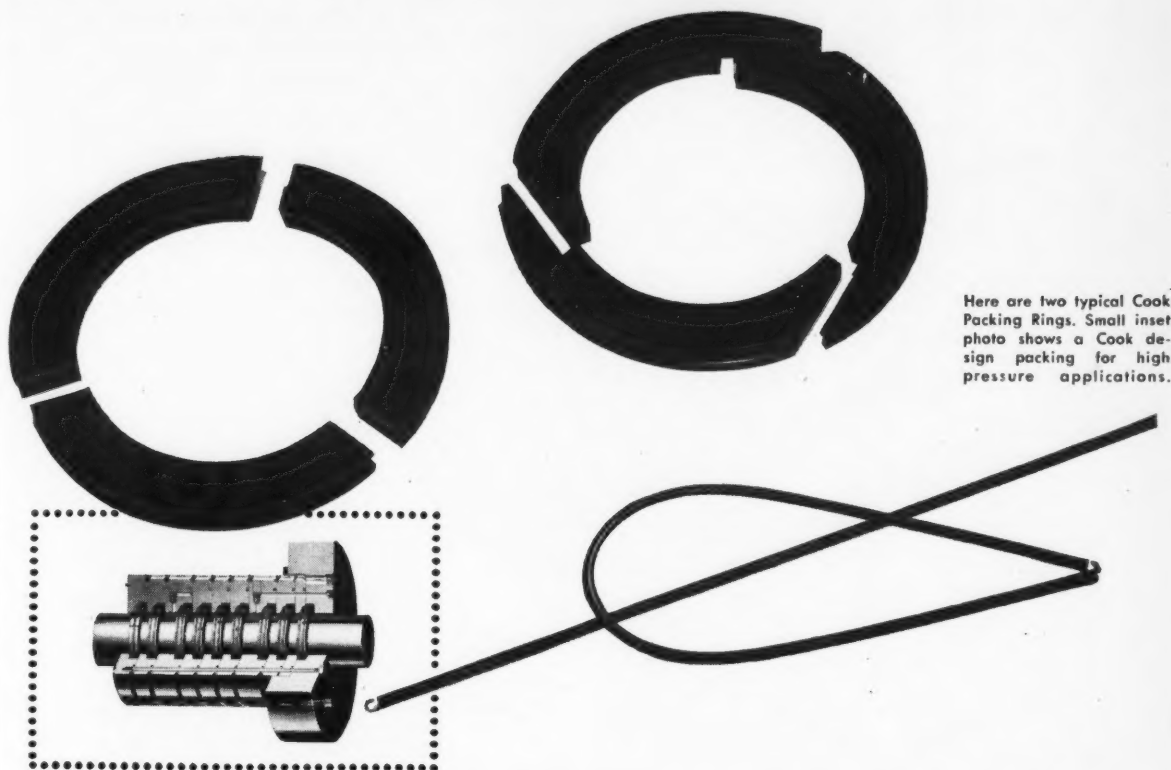
and poisonous gases are vented from burning building.

**Description:** Blade diameters on fans range from 24 to 60", with exhaust capacities of 6640 to 53,700 cfm. Damper blades pivot on maintenance-free bearings and open with minimum fan pressure. Airfoil-shaped fan blades provide maximum thrust at lowest rpm. Damper head is galvanized steel.

(Hi-velocity roof ventilator is product of Chicago Blower Corp., Dept. CP, 9863 Pacific Ave., Franklin Park, Ill. . . . or for more information check 1358 on form opposite last page.)



**Look to COOK for Better Packings!**



Here are two typical Cook Packing Rings. Small inset photo shows a Cook design packing for high pressure applications.

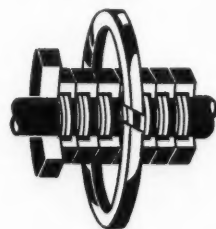
## IMMEDIATE DELIVERY on Cook replacement packing rings!

**F**OR standard service replacements, Cook carries in stock a wide range of packing-ring sizes — in Graphitic Iron, Cookmet, Bronze, Babbitt, Phenolic, and Carbon for non-lubricated service. *All are available for immediate shipment!*

For ultra high pressure service, Cook can supply replacement packing rings to meet your exact requirements. These high pressure rings are pre-

cision made and lapped to prevent pressures from escaping by the rod or across the face of the rings.

Standard or high pressure, you can depend on Cook for the finest in replacement packing rings. Write for packing-ring application bulletin and name of your nearest C. Lee Cook representative. C. Lee Cook Company, 926 South Eighth Street, Louisville, Kentucky.

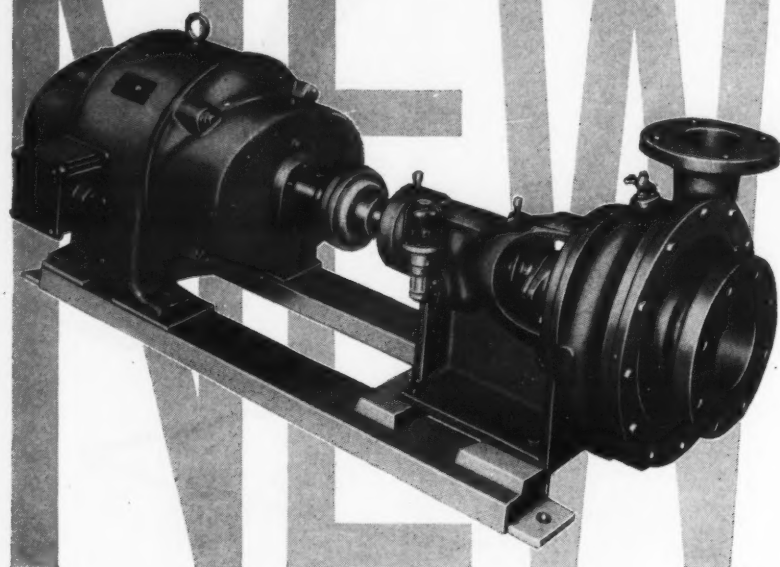


**C. LEE  
COOK  
COMPANY**

A Subsidiary of Dover Corporation

*Rings and Packings Since 1888*

When inquiring check 1359 opposite last page



## New... and in stock! Ampco Centrifugal Pumps in 316 Stainless

Hydraulic range  
includes capacities  
to 600 gpm.,  
heads to 160 feet.

Pedestal assemblies  
available for  
base-mounted coupling  
connections.

Close-coupled  
connections fit NEMA  
standard pump motors.

New, high-speed pumps for handling clear liquids  
and fine slurries not corrosive to GR. 316 SS.

Although stock items, these pumps include fea-  
tures which, until now, have been available only  
on special order for custom-built models:

1. **Correct-design closed impellers** — for greater efficiency, longer life.
2. **Wear rings** — to save the casing, prevent expen-  
sive repairs, reduce down-time.
3. **Shaft sleeves** — to give greater operating economy,  
eliminate worn shafts, cut maintenance costs.

Ask your Ampco Pump Distributor to show you  
how these off-the-shelf pumps are easily adapted  
to the particular requirements of your specific  
application. Write for his name—and Bulletin P-3C.



**AMPco METAL, INC.**  
Dept. CP-1, Milwaukee 46, Wis. • West Coast Plant: Burbank, Calif.  
**THE METAL WITHOUT AN EQUAL**

AMPco — ONE-SOURCE SERVICE FROM RAW MATERIAL TO FINISHED PRODUCT



SAND CASTINGS



CAST FLANGES



FORGINGS



CENTRIFUGAL CASTINGS



EXTRUSIONS



CAST PIPE FITTINGS



FABRICATIONS



SHEET AND PLATE



MACHINED PARTS

PR-23

When inquiring check 1360 opposite last page

## ENGINEERING

### Low cold flow is trait of Teflon-felt gasket . . .

thermal and chemical proper-  
ties of Teflon are retained

**Uses:** Industrial gasketing ma-  
terial possessing outstanding  
chemical and physical properties.

**Features:** Teflon-felt combina-  
tion combines exceptional thermal  
and chemical properties of Teflon  
with low cold flow characteristics.

**Description:** Gasketing is a  
high-pressure, sheet stock lami-  
nate consisting of plies of me-  
chanically-interlocked synthetic fi-  
ber felt impregnated with Teflon  
resin. It is available in two types,  
one for general purpose applica-  
tions, and one for applications  
involving irregular flange surfaces  
and pressures. Thicknesses from  
1/64 to 1/16" are now available.

(Teflon-Vistex is available from  
American Felt Co., Dept. CP,  
Glenville, Conn. . . or for more  
information check 1361 on form  
opposite last page.)

### Filter cartridge designed for low pressure drop, high flow rate . . .

removes five-micron particles  
from oil or water

**Uses:** Filtration of lubricating,  
fuel, industrial oils; aqueous solu-  
tions such as coolant compounds.

**Features:** Filter cartridge is de-  
signed for high flow rate and low  
pressure drop. Field reports indi-  
cate filtration of particle sizes down  
to 5 microns.

**Description:** Cartridge is avail-  
able for all sizes of company's  
filters. It consists of graded cotton  
fibers felted into sheets and im-  
pregnated with a thermosetting  
plastic resin.

(Tufite filter cartridge is avail-  
able from Purifier Div., The  
Hilliard Corp., Dept. CP, 104 W.  
Fourth St., Elmira, N. Y. . . or  
for more information check 1362  
on form opposite last page.)



## NEW! Uniform Pipe Identification System

Makes it easy and economical  
to standardize pipe marking

Free  
Planning  
Kit

- Shows you how and where to mark utility, process, and supply lines.
- Shows you how to estimate costs.
- Tells you how to write specifications.
- Simplified check list figures your marking needs.
- You can compare actual costs for painting and stenciling vs. the Brady System.
- Planning Schedule helps install marking system fast at lowest cost.
- You get working samples for testing.

If marking pipes is your responsibility, write for this  
valuable Planning Kit on your letterhead today.

W. H. Brady Co., 756 W. Glendale Ave., Milwaukee 9, Wis.

When inquiring check 1363 opposite last page

## BETTER PERFORMANCE

- Less slippage
- Longer life



Try Darcova Puncups in your  
reciprocating pumps and cylin-  
ders, and you too will realize  
what a big difference they make.

Because they are "engineered"  
for their job—in precisely con-  
trolled textures, shapes and  
types—and are noted for out-  
lasting other packings at least  
3 to 1! Why not get the advan-  
tage of this tremendous saving  
in maintenance and down-time?

### Get all the facts

Send today for helpful Bulletin No. 5503.

**DARLING VALVE & MANUFACTURING CO.**  
Williamsport 4, Pa.



TRADE MARK  
**Puncups**

When inquiring check 1364 opposite last page

CHEMICAL PROCESSING



**Wide variations in load handled by steam trap . . .**

orifice operates through entire pressure range without necessity of adjustment

**Uses:** Removing condensed moisture, or water coming over from boiler, from steam piping systems.

**Features:** Steam traps are designed for installations requiring a wide variation between startup and operating load, frequent shutdowns and start-

ups, or large amounts of air elimination on startup, or during operation. Trap is fitted with an orifice that operates through entire pressure range without necessity of adjustment.

**Description:** Units are cast semi-steel, cast steel, or cast bronze. They are available for steam pressures up to 300

psi and temperatures up to 500°F. Inlet and outlet connections range from 1/2 to 2". Optional piping, angle or straight-through, is available on cast semi-steel units. Bottom outlet decreases danger of freeze up. Each trap is provided with bronze or Monel bellows.

(Bellows Thermostatic Steam Trap is a product of The Clark Manufacturing Co., Dept. CP, 1830 E. 38th St., Cleveland 14, Ohio . . . or for more information check 1365 opposite last page.)

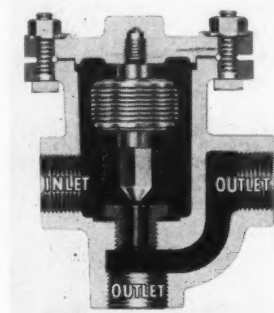
**Make faster, neater installations, of rigid and thinwall conduit or pipe, with metal strap**

**Uses:** Holding pipe or rigid and thinwall conduit.

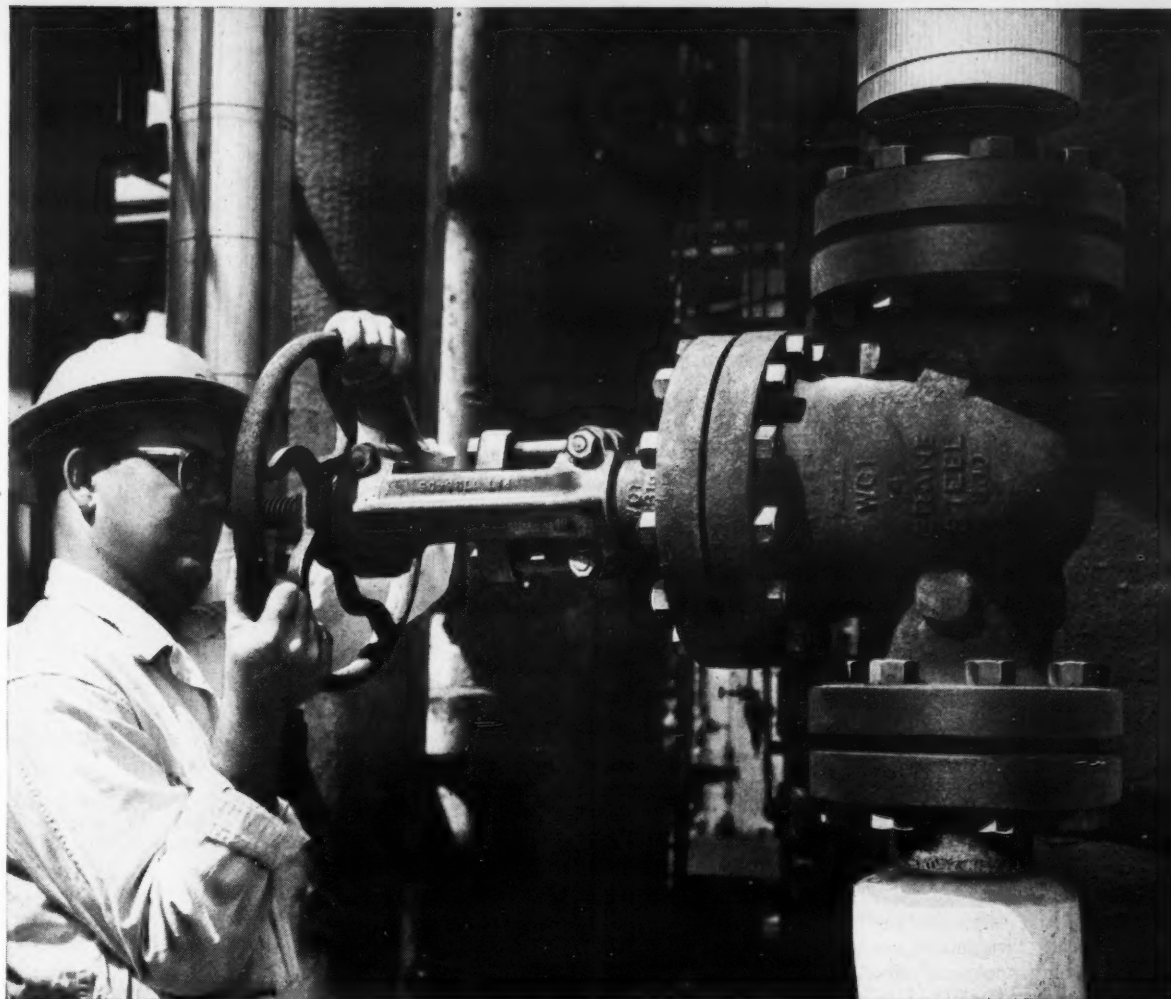
**Features:** Neater, faster installations are possible because strap can be snapped on to pipe or tubing where it holds firmly yet can be pushed to either side for positioning.

**Description:** Straps are made of heavy gauge steel, zinc plated. They are available in six sizes from 1/2 to 2" for thinwall conduit, and seven sizes from 3/8 to 2" for rigid conduit and pipe.

("Snap-On" Straps are available from Holub Industries, Inc., Dept. CP, Sycamore, Ill. . . . or for more information check 1366 on form opposite last page.)



Bellows is of bronze or Monel

**Two years on high-pressure hydrogen ... no leakage ... no maintenance!**

Two years ago, Celanese Corp. installed this Crane valve in their large petrochemical plant in Bishop, Texas. It's a 4-inch No. 76XR 600-pound steel gate valve, on a line to a hydrogenation reactor. Pressure is 800 psi. and temperature 375° F.

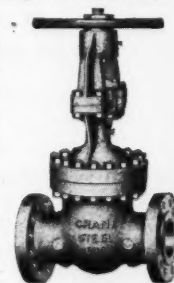
What's the maintenance cost story on this valve—after 2 years of such severe service? *It hasn't cost a dime.* Celanese maintenance

crews haven't been near it once with a wrench. Leakage? *Zero*—there hasn't been a trace of leakage during the 2 years the valve has been on the line.

Outstanding? Not for Crane valves. You'll find Crane valve performance records like this in chemical plants everywhere, and throughout industry. Crane's strictly quality design, materials, assembly and

testing assure you of such dependable and low cost flow control service.

You'll find everything you need in valves and fittings in the complete Crane line. Get full information from your local Crane Representative, or write to the address below.

**CRANE VALVES & FITTINGS**  
PIPE • KITCHENS • PLUMBING • HEATING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

When inquiring check 1367 opposite last page

# new literature

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheets, etc., are found throughout other sections of the magazine

## **Fertilizer processing equipment design and installation**

Ammoniators, granulators, dryers, coolers, air-handling systems, and pilot plant equipment are covered in 12-page, two-color bulletin. Photographs and detailed drawings show equipment and plant installation. Layout of fertilizer plant air-handling system and granular fertilizer unit flowsheet are included.

"Continuous Granular Fertilizer Processing Equipment" is issued by Edw. Renneburg & Sons Company, Dept. CP, 2639 Boston St., Baltimore 24, Maryland. When inquiring specify 1368 on form opposite last page.

## **Details metering pump accuracy tests**

Factors governing accuracy in controlled volume pumping are described in five-page technical paper. Test procedures and results of separate investigations into metering accuracy by research organization and industrial user are given. Typical systems are described to illustrate how controlled volume pumps are used as flow controllers, ratio controllers, and final control elements.

Technical Paper No. 65 is issued by Milton Roy Company, Dept. CP, Station M, 1300 E. Mermaid Lane, Philadelphia 18, Pa. When inquiring specify 1369 on form opposite last page.

## **Data on thermocouples for gases and vapors**

Bulletin of six pages on thermocouples contains easy-to-use chart permitting selection of thermocouple with exact specifications needed. Data on miniature, shielded thermocouples for gases and vapors include calibrations, temperature ranges, materials of construction, and immersion lengths available. Special section covers terminals and quick-coupling connectors.

"Shielded Thermocouples — Type 6" is issued by Thermo Electric Co., Inc., Dept. CP, Rochelle Park, PO Saddle Brook, N. J. When inquiring specify 1370 on form which is located opposite last page.

## **Tools and techniques in air pollution control**

Four-page article explains scientific methods available for study of various aspects of air pollution which are part of consultation service offered by organization. Article discusses pilot-scale research, testing and design; tall stack dispersion analyses by model wind tunnel and micrometeorological studies; new-plant surveys; dust collector and fly ash arrestor acceptance testing; particle size measurements in dust collector and air cleaner applications; stack emission surveys; stack gas tracer studies; and community surveys for ordinance and zoning development.

"Tools and Techniques in Air Pollution Control" is issued by Hemeon Associates, Dept. CP, 121 Meyran Ave., Pittsburgh 13, Pa. When inquiring specify 1371 on form which is located opposite last page.

## **Engineering formulas and tables**

Data book contains 350 pages of basic formulas, design data, and tables for three branches of engineering. Sections include Mathematics, Measures, Materials, Mechanics, Electricity and Magnetism, Pipe and Fittings, and Mathematical Tables. Book is pocket size with 12 division sheets with printed tabs to furnish immediate access to particular information desired.

To obtain "Engineering Formulas and Tables" No. 783 remit \$2.75 direct to Lefax Publishers, Dept. CP, Philadelphia 7, Pa. When inquiring specify 1372 on form opposite last page.

## **Offers three portable mullers that are easy to clean**

Facility of cleaning and reassembling is feature of portable laboratory mullers. Three models are illustrated; specifications and suggested uses are included.

Brochure is issued by Gardner Laboratory Inc., Dept. CP, P.O. Box 5728, Bethesda 14, Md. When inquiring specify 1373 on form located opposite last page.

## **Thermal-conductivity analyzers explained**

Information on operation, make-up, and application of continuous thermal-conductivity analyzer for gases is contained in 15-page illustrated bulletin. Calculations and table of thermal conductivities also appear.

Bul TD-507 is issued by Arnold O. Beckman Inc., Dept. CP, 1020 Mission St., South Pasadena, Calif. When inquiring specify 1374 on form opposite last page.

## **Buying information for motors**

Data and proper selection of electric motors for a particular application are presented in two bulletins of 11 pages each. Application data, ratings, and prices are given for fractional horsepower, integral-horsepower polyphase, and single phase induction motors, motors and control for part-winding starting, gear-motors, and resilient-base, integral-horsepower induction motors.

Bul GEC-1026A, GEC-1027A are issued by General Electric Co., Dept. CP, Schenectady, N.Y. When inquiring specify 1375 on form opposite last page.

## **Underground pipe protected with tape insulation**

Techniques for protecting underground pipe from corrosion with manufacturer's brand of pipe insulation tape is subject of 24-page booklet. Step-by-step photographs and instructions for wrapping bends, elbows and short sections, patching pipe with tape, preparing joint surfaces for wrapping, wrapping welded joints and taping straight pipe sections are provided. Table listing recommended tape width for different pipe sizes, outlining minimum recommended tape overlap and number of squares of tape needed per 100-ft of pipe is included.

"Tape It Easy" is issued by Minnesota Mining and Manufacturing Company, Dept. CP, 900 Fauquier St., St. Paul 6, Minn. When inquiring specify 1376 on form opposite last page.



### Engineering of corrugated shipping boxes shown

Useful information on designing efficient corrugated shipping boxes is contained in 24-page booklet. Study of the product to be packaged, original engineering, exterior box design, construction of pilot box, and testing, are steps covered in the development of a shipping box. Photographs illustrate various stages in box development, and show examples of properly-engineered boxes.

"How to Engineer Corrugated Shipping Boxes" is issued by Hinde & Dauch, Dept. CP, Sandusky, Ohio. Check 1377 opposite last page.

### Lubrication of heavy open gearing and slide surfaces shown

Brochure of eight pages, in three colors, illustrates manual and automatic systems and component equipment for lubrication of heavy open gearing and slide surfaces. Schematic layouts as well as application photographs are used.

Bul 60-A is issued by The Farval Corp., Dept. CP, 3249 E. 80th St., Cleveland 4, Ohio. When inquiring check 1378 opposite last page.



"Frankly, I think Homer is getting serious about me. Every time I turn on the gas, he rushes over to light the burner for me!"



## They Knew What They Wanted

The twelve LaBour Type G pumps in this picture are handling plating solutions and waste, acid and alkaline, in a large Michigan plant producing small hardware for automobiles. In this highly competitive business every penny of cost is scrutinized with a thorough-going care not always found in other industries. The fact that this company chose LaBours is evidence that they expect minimum over-all costs.

As this is written the twelve pumps have been operating on a two-shifts-per-day basis for eight months with no trouble. Since these are LaBour *packingless* pumps, maintenance has been virtually nil.

If you are trying to hold costs down—and who isn't, these days?—it will pay you to investigate LaBour pumps for handling your corrosive and other difficult liquids. We can show you some mighty interesting performance facts and figures.

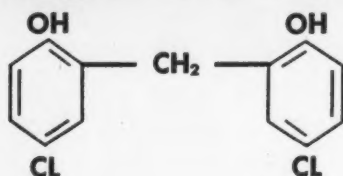
ORIGINAL MANUFACTURERS OF THE SELF-PRIMING CENTRIFUGAL PUMP

# LABOUR

THE LABOUR COMPANY, INC. • Elkhart, Indiana, U.S.A.



When inquiring check 1379 opposite last page



Mildew or Bacteria problem?

**G-4**<sup>®</sup>  
(DICHLOROPHENE)

Here is a potent and versatile fungicide and bactericide that offers special advantages in a wide variety of applications. It may be *exactly* the preservative you are seeking to solve a deterioration problem or improve the salability of a product.

G-4 is safe to use, and it is used in cosmetic, pharmaceutical and veterinary products. It is light in color, low in odor. Other uses include textiles, cutting oils, disinfectants, paper, emulsions. We welcome your request for samples and technical information.

**SINDAR**<sup>®</sup> Corporation  
Industrial Aromatics and Chemicals  
330 West 42nd Street, New York 36, N. Y.

When inquiring check 1380 opposite last page

only **ATLAS** offers...

Plant Wide Protection from Corrosion

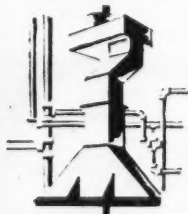


#### CORROSION-PROOF CEMENTS

Atlas manufactures a complete line of corrosion-proof cements, each designed to do a particular job. The choice involves a thorough study of conditions and materials being handled.

#### CORROSION-PROOF LININGS

There is an Atlas tank lining to solve your corrosion problem. Atlas linings are based on the highest quality manufactured materials available and are installed at an Atlas plant or in the field.



#### RIGID PLASTIC STRUCTURES

Corrosion resistant self-supporting plastic structures are designed and fabricated to meet your specific needs... complete plastic pipe systems including flanges, valves, and fittings are also available.

**ATLAS MINERAL**  
MERTZTOWN, PENNSYLVANIA

Write for Bulletin CC-3 for complete information on the Atlas line.

When inquiring check 1381 opposite last page

#### NEW LITERATURE

##### Shows conveyor system for pallets

Including a case history on solving a material handling problem, 28-page brochure describes mechanized conveying of pallets and palletized material.

Form GP-56 "Guided Pallet" is issued by The Rapids-Standard Co., Inc., Dept. CP, 342 Rapistan Building, Grand Rapids, Michigan. When inquiring specify 1382 on form opposite last page.

##### Illustrates complete line of service cocks

Featuring a tamper-proof service cock specially designed to eliminate tampering in an exposed installation, bulletin of 12 pages, two colors, illustrates manufacturer's complete line of service cocks. Valves listed are designed for moderate pressure service — as gas, water, and utility services.

Bul V-605 is issued by Meter and Valve Division, Rockwell Manufacturing Company, Dept. CP, 400 N. Lexington Ave., Pittsburgh 8, Pa. When inquiring specify 1383 on form opposite last page.

##### Details vibration monitor

Eight-page, two-color brochure describes vibration monitor and tells how it is useful in protecting all types of rotating equipment against damage in event of failing bearing or other mechanical malfunctions. Control circuit and type selection details are also explained.

Booklet contains drawings of unit and housing as well as circuit diagrams on various models.

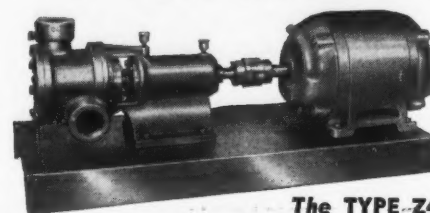
Bul 500-5 is issued by the Beta Corp., Dept. CP, Richmond 26, Va. When inquiring specify 1384 on form which is located opposite last page.

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LIQUEFIED PETROLEUM GASES, REFRIGERANTS and other LIGHT NON-VISCOUS LIQUIDS

Bothersome to You?

IT NEED NOT BE



The TYPE-Z4  
**AURORA<sup>®</sup> APCO Process PUMPS**

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You are urged to get acquainted with this complete answer to many of the most difficult pumping tasks of modern industry. The characteristics of the most advanced turbine-type pump, the APCO, combine with special new design features, special metals where required to insure SURE RESULTS. May we tell you more?

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INTERNATIONAL SALES OFFICE, 90 WEST ST., NEW YORK 6, N. Y.

When inquiring check 1385 opposite last page

**YOURS  
FREE!**

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- Tells how to protect metal, masonry and wood against acids, alkalis, alcohol, oils, gasoline, solvents, salts and water with DEL Coatings.
- Describes how DEL Synthetic Rubber Compound solves the problem of joining metal, wood, masonry and glass in a permanent, weathertight seal.
- Carefully tabulated and organized to help corrosion, construction and chemical engineers and architects find the right product for each structural sealing and protective coating problem.

For a free copy of this new, easy-to-use catalog, write today!



DAVID E. LONG CORP., DEPT. CP-17  
220 East 42nd St., New York 17, N. Y.

Please send me FREE, your new catalog on DEL Protective Coatings and DEL Synthetic Rubber Compound.

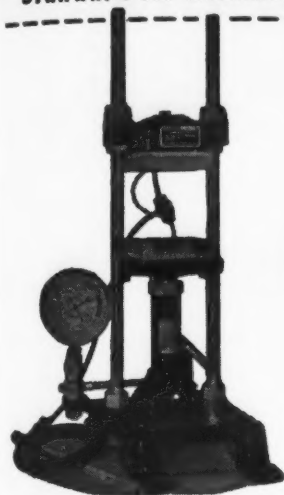
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When inquiring check 1386 opposite last page

CHEMICAL PROCESSING



## Standard for Research and Development



### the CARVER LABORATORY PRESS



... wherever Pressing is required.

Accurately controlled pressures to 20,000 lbs.; 6-inch gauge mounted on base. Carver Standard Accessories include Electric or Steam Hot Plates, Carver Test Cylinders, Swivel Bearing Plates, Cage Equipment. Available from stock. Write for catalog.

**FRED S. CARVER INC.**  
HYDRAULIC EQUIPMENT  
52 RIVER ROAD, SUMMIT, N. J.

When inquiring check 1387 opposite last page

## Long-Wearing Liquidtight Stanzoil® Gloves



No. N-54

Of milled Du Pont Neoprene to resist oils, acids, caustics, greases, solvents, chemical and abrasive materials. Permanently satinated inside with non-slip grip outside. Light, medium and heavy weights in sizes to fit every hand. PIONEER will help you select the right glove for your job from the complete PIONEER line.

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Willard, Ohio, U.S.A.

Please send me:

- ☐ The name of my nearest PIONEER Glove Distributor.
- ☐ 1956-57 PIONEER Industrial Glove Catalog.
- ☐ Your glove recommendation for job described in enclosed letter.

Firm

Address

City

Zone

State

Signed



When inquiring check 1388 opposite last page

## NEW LITERATURE

### Feeding sticky materials? Solution suggested

Design, adaptability, and performance of feeder for non-free-flowing material is described in four-page, two-color catalog. Table of standard sizes and capacities is included. Pictures show various size units and modifications. Free testing service explained.

Cat 5607 is issued by Pulva Corporation, Dept. CP, 555 High St., Perth Amboy, N. J.

### Shows monitor system for remote metering

Bulletin of two pages describes features and suggests applications of remote metering system with "plug-in" construction. System described uses transducers.

"Remote Metering System" is issued by Sparton Control Systems Division, The Sparks-Withington Company, Dept. CP, Jackson, Mich. When inquiring specify 1389 on the convenient Reader Service slip opposite last page.

### High-temperature project — Navy's final report

Five years of Naval research into new methods for production and maintenance of high temperatures in special furnaces is summarized in 65-page report. Project covers two phases — combustion of metals and combustion of gases. Report summarizes investigations in each category and refers for complete descriptions to detailed reports issued periodically during the work.

To obtain report, PB 121024, "Office of Naval Research High Temperature Project, Final Report," remit \$1.75 direct to Office of Technical Services, U.S. Department of Commerce, Washington 25, D. C.



## John Crane CHEMLON® C-V RINGS ARE INDUSTRY'S MOST UNIVERSAL PACKING ...

Countless successful applications of C-V Rings under the most severe service conditions have made this the closest approach to a universal packing.

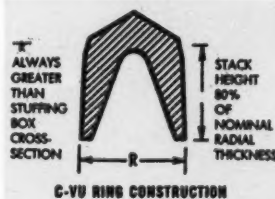
It will effectively handle all industrial acids, alkalis, solvents, organic and hydraulic fluids ... temperatures from -120°F. to +500°F. ... is equally suited to valves, pumps, mixers, hydraulic cylinders and like equipment.

"John Crane" C-V Rings have extremely low coefficient of friction. "Break-out" friction is only slightly higher than running friction.

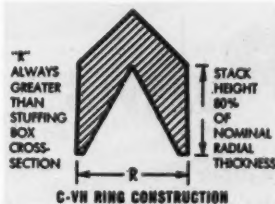
### TWO STYLES ARE AVAILABLE:

**C-VU RINGS for low pressure service**  
—such as control and regulator valves handling gases and fluids, where it is necessary to have a very sensitive and resilient type packing.

**C-VH RINGS for high pressure service**  
—for use in pumps, hydraulic cylinders and like services at pressures ranging to 500 psi. and over. These rings are constructed with a heavy wall heel to withstand pressure requirements. They are designed to provide voids between rings, so that as the Teflon expands due to heat,



C-VU RING CONSTRUCTION



C-VH RING CONSTRUCTION

this take-up room minimizes any excess friction in the stuffing box. "John Crane" C-V Rings are available in full line of standard sizes and male and female adaptors. Sizes can be molded to stuffing box specifications.

Request Bulletin T-110.

"John Crane" C-V Rings are made from Chemlon—the best in DuPont Teflon.

Crane Packing Co., 6421 Oakton St., Morton Grove, Ill. (Chicago Suburb). In Canada: Crane Packing Co., Ltd., Hamilton, Ont.



When inquiring check 1390 opposite last page

# given:

- to add nitric acid to liquid isotope at 4500 psi.
- to pulse liquid extraction columns — 4½ gal. per stroke, 100 strokes per min.
- to pump liquid oxygen at minus 340°F.
- to flow-blend inhibitors in high pressure process lines.
- to charge pressurized-water atomic power systems.
- to pump additions of D<sup>2</sup>O to new homogeneous reactors.

## PHILADELPHIA SERIES HP HIGH PRESSURE PUMPS

... are the solution to these and many other process pumping requirements outside the realm of ordinary proportioning pumps.

CATALOG HP-1254 describes these advanced design Pumps. They meet an entirely new conception of operating requirements—demanded by modern high pressure processing techniques.

**PHILADELPHIA PUMP & MACHINERY COMPANY**  
13500 Philmont Avenue, Philadelphia 16, Pa.  
SUBSIDIARY, AMERICAN METER COMPANY

When inquiring check 1391 opposite last page

### NEW LITERATURE

#### Deals with double-disc attrition mills

Double-disc attrition mills, adaptable to fine grinding of many materials, are described in four-page bulletin. Photographs, charts, and drawings cover design, construction, and specifications of various size units. Photographs of actual installations are included.

Bul A-5-A is issued by The Bauer Bros. Co., Dept. CP, 1728 Sheridan Ave., Springfield, Ohio. When inquiring specify 1392 on form which is located opposite last page.

#### Cements and coatings for corrosives

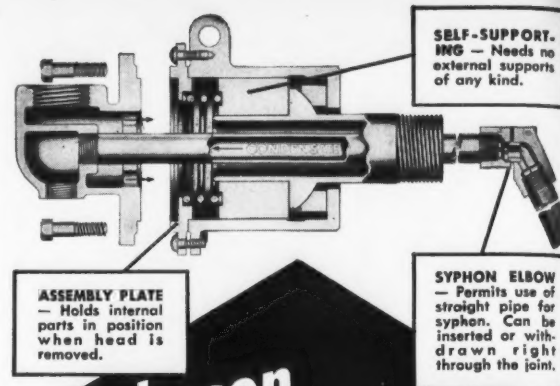
Eight-page bulletin tells how to select the right cement mortar for a specific corrosive application. Photographs of typical applications are given. Method for calculating the amount of cement and brick needed is given. Publication also includes information on protective coatings and linings.

Bul CP-614A is issued by Corrosion Engineering Dept., Pennsylvania Salt Manufacturing Co., Dept. CP, 3 Penn Center Plaza, Philadelphia 2, Pa. When inquiring specify 1393 on form which is located opposite last page.

#### Ring forging explained in booklet

Illustrated booklet of 16 pages explains production of seamless forged and rolled rings. Handy four-page chart shows, for eighth-inch divisions, weights for rings form one inch to 145 inches overall diameter.

Bul SF-1 is issued by Alco Products, Inc., Dept. CP, PO Box 1065, Schenectady 5, N.Y. When inquiring specify 1394 on form which is located opposite last page.



## Johnson Rotary Joint with SYPHON ELBOW

Johnson Joints represent the best way industry has yet found to get steam or liquids into rotating rolls and cylinders. They are completely packless, need no lubrication or adjustment. The Type SBP shown gets steam in, condensate out, through the same head. Other types available for through flow service, in sizes to meet all operating needs.

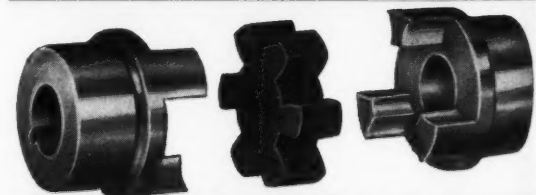
WRITE FOR COMPLETE INFORMATION.

**The Johnson Corporation**

826 Wood St., Three Rivers, Mich.

When inquiring check 1395 opposite last page

## A GERBING EXCLUSIVE!



## FLEXIBLE COUPLING with Concave Jaw Surfaces...

The exclusive CONCAVE jaw surfaces of the Gerbing Flexible coupling actually holds the Buna-N rubber insert or spider within the jaws and prevents the rubber from extruding under load. Effectively absorbs shock, vibration, and misalignment. Requires no lubrication. Available for shafts ½" to 2½" and H.P. ranges from fractional thru 30. Deliveries from dealer and factory stocks. Increase your coupling service life. Write for complete information.



Concave jaws hold spider in position at all times ... no extruding

Hub, bore, and outside diameter concentricity assure vibration-free operation.



When inquiring check 1396 opposite last page

CHEMICAL PROCESSING



## NEW LITERATURE

### Nitrogen fertilizer solutions

Up-to-date data on nitrogen solutions for the fertilizer and chemical industries are available in 48-page handbook. Complete with illustrations and tables, this spiral-bound handbook describes chemical, physical properties, storage information, and information on granulation and formulation, of fertilizers. Many formulas and conversion factors are included.

"Nitrogen Fertilizer Solutions" is issued by Nitrogen Division, Allied Chemical & Dye Corporation, Dept. CP, 40 Rector Street, New York 6, N.Y. Specify 1397 on form opposite last page.

### Over 400 reagents and chemicals cataloged and described

Over 400 analytical reagents and other chemicals useful in the lab are listed and described in this 200-page, digest-size catalog. Specs, prices, are given. Atomic weights, storage data, and a chart for specifying reagents, are included.

"1956 A.R. Catalog" is issued by Mallinckrodt Chemical Works, Dept. CP, Second and Mallinckrodt Streets, St. Louis 7, Mo. When inquiring check 1398 on the convenient Reader Service slip which is located opposite last page.



"... and it makes the weed grow to the extent where you can get a better grip in pulling it out..."

Cartoon by Roger Carling, Atomics International, Division North American Aviation, Inc., Canoga Park, Calif.



**SETTING  
NEW STANDARDS  
OF PERFORMANCE...**

**Another  
LUNKENHEIMER  
FIRST!**

**THE  
LQ600  
VALVE**

**FIG. LQ600-200**  
200 lb. S.P.—400 lb. W.O.G.  
550° F.

**FIG. LQ600-150**  
150 lb. S.P.—300 lb. W.O.G.  
1/4 to 2 inches

Thousands of these valves have served for as long as five years without replacement, regrinding, maintenance, or leakage—even on the most severe services. Their patented Brinallloy\* seats and discs are more resistant to wear and corrosion than 500 Brinell Stainless Steel... even outlast case-hardened Stainless Steel exceeding 1000 Brinell. LQ600 Valves practically eliminate maintenance costs!

\*Patented Alloy—T. M. Reg.

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THE LUNKENHEIMER CO., CINCINNATI 14, OHIO

**LUNKENHEIMER®**  
THE ONE *Great* NAME IN VALVES

L-436-28

When inquiring check 1399 opposite last page

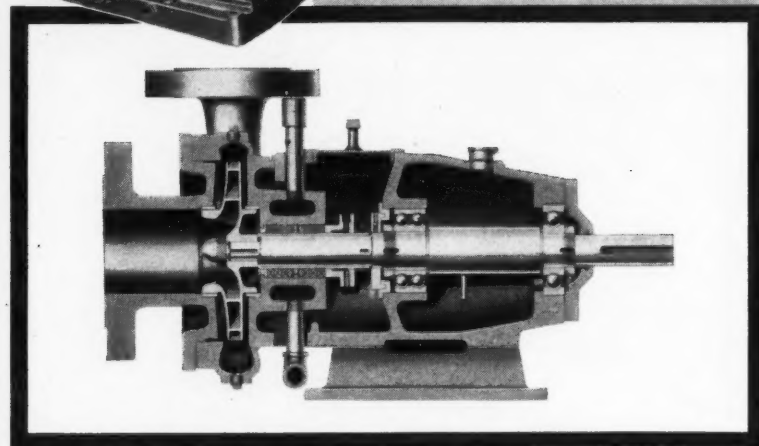
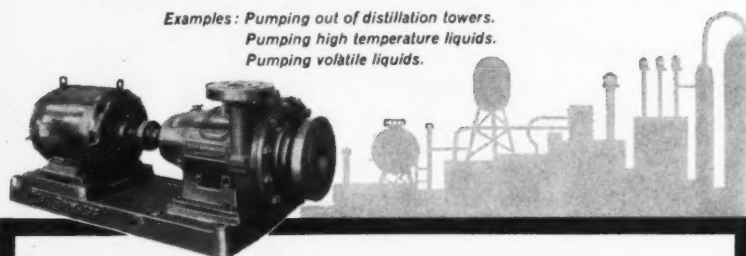


# HOW! PUMP USERS— SOLVE YOUR NPSH\* TROUBLES WITH DEAN BROTHERS STANDARD CENTRIFUGAL PUMPS

These standard, horizontal, centrifugal pumps are designed to operate with low \*Net Positive Suction Heads. This keeps equipment and operating costs down in process industries...

- where the pump suction is under low absolute pressure,
- where liquid pumped is close to its vapor pressure due to temperature.

Examples: Pumping out of distillation towers.  
Pumping high temperature liquids.  
Pumping volatile liquids.



The low NPSH requirements of Dean Brothers standard centrifugal pumps result from the design of the impeller for low inlet losses—without danger of cavitation and the resultant loss of head and capacity.



Dean Brothers offers a series of charts showing the relationship between pump rotative speed, pump capacity and NPSH. Process designers find them valuable in sizing and locating vessels and pumps on flow sheets as well as for the trouble-free application of pumps. They're free. Write for Curve No. S-1B



## DEAN BROTHERS PUMPS INC.

EST. 1869

323 West 10th St., Indianapolis 7, Ind.

When inquiring check 1400 opposite last page

## NEW LITERATURE

**Tells about tube expanders  
in 119 pages**

Detailed information on tube expanders and associated tools used for tube rolling is contained in well-illustrated, 119-page catalog. Uses of each piece of equipment and new tools and methods are discussed.

Cat 88 is issued by Thomas C. Wilson, Inc., Dept. CP, 21-11 44th Ave., Long Island City 1, N.Y. When inquiring specify 1401 on convenient Readers Service slip opposite last page.

## Monomers for resins

Properties and suggested uses for 36 monomers available from supplier are covered in this four-page bulletin. The many uses for the polymers and copolymers prepared from these monomeric compounds are listed.

Folder F-40033 is issued by Carbide and Carbon Chemicals Co., A Div. of Union Carbide and Carbon Corp., Dept. CP, 30 E. 42nd St., New York 17, N.Y. When inquiring check 1402 opposite last page.

## Illustrates variety of uses for power conveyors

Including listing of sizes, 24-page bulletin provides information on 19 different types of power conveyors. Mobile, stationary, horizontal, and inclined conveyors are shown. Special types of equipment such as suspended tray elevators, barrel, keg and sack elevators, reciprocating hoists, and live-roller conveyors are included. Installation photos depict conveyors in operation in many different industries.

Bul 302 is issued by Harry J. Ferguson Co., Dept. CP, 149 West Ave., Jenkintown, Pa. When inquiring specify 1403 on form opposite last page.



# Guaranteed GREATER ACCURACY

than any other  
Variable Speed  
Drive



## GET *Graham*

most reliable variable speed drive made

- **ULTIMATE IN SIMPLICITY AND COMPACTNESS** — a straight line extension of a standard induction motor — or available without motor.
- **UNLIMITED SPEED RANGE** — from any desired maximum speed to zero, including reverse, without stopping motor.
- **UNMATCHED ACCURACY** — of speed setting and re-setting and speed holding.
- **NO PERISHABLE PARTS** — such as belts or tubes, requiring periodic replacement.
- **PROVED PERFORMANCE** — twenty years satisfactory use as standard equipment.
- **LOW COST** — a better job for less money.

**GRAHAM TRANSMISSIONS, INC.**  
Dept. CP • MENOMONEE FALLS, WISCONSIN

When inquiring check 1404 opposite last page

# Lumenite

## AUTOMATIC CONTROLS

### ELECTRONIC LIQUID LEVEL INDUSTRIAL TIMERS TIME SWITCHES MAGNETIC SWITCHES

Ask for  
Bulletin

FL—Liquid Level  
FM—Milk Level  
FN—Nonconductive Liquid  
LYC—Ice Thickness  
SH—Boiler Level

Ask for  
Bulletin

LY—Time Switches  
PC—Program Clocks  
CR—Cycle Repeaters  
R—Time Delay Relay  
RMC—Automatic Reset

**Lumenite Electronic Company**

407 S. Dearborn Street Chicago 5, Ill.

When inquiring check 1405 opposite last page

CHEMICAL PROCESSING



**'Slide Rule' comparator  
determines film costs**

Functioning like a slide rule, comparator quickly determines costs per square foot of "Mylar," polyester film compared to other materials. Reverse side matches main physical, chemical, thermal, and electrical properties of polyester films with those of polyethylene, acetate, acetatebutyrate, polystyrene, rag paper, varnished cambric, and PVC.

"Slide Rule" comparator is issued by DuPont Film Department, E. I. du Pont de Nemours & Co., Inc., Dept. CP, Wilmington 98, Delaware. When inquiring check 1406 on the convenient Reader Service slip located opposite last page.

**Chemical and physical data  
on 16 lithium compounds**

Detailed data on the uses and chemical and physical properties of 16 lithium compounds are contained in 38-page folder. Folder is in loose leaf form to provide for insertion of new data as they become available.

"Chemical and Physical Properties of Lithium Compounds," is issued by Foote Mineral Co., Dept. CP, 18 W. Chelton Ave., Philadelphia 44, Pa. When inquiring specify 1407 on form opposite last page.

**Over 3500 organic chemicals**

More than 3500 organic chemicals are described in this 224-page, 6x9½" catalog. Most of these are research chemicals with long-sounding names, but you'll find many of the old stand-bys listed, too. Quantity and price data are given.

"Eastman Organic Chemicals List No. 40" is issued by Distillation Products Industries, Div. of Eastman Kodak Co., Dept. CP, Rochester 3, N.Y. Check 1408 opposite last page.

**Comparative coatings chart  
guide for engineers**

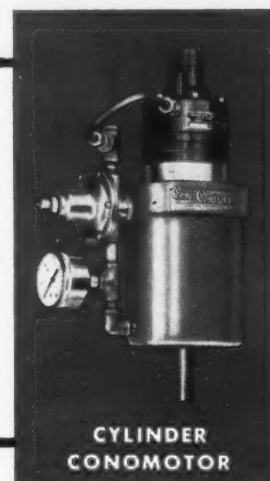
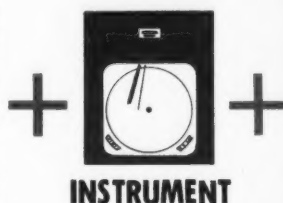
Chart which shows the comparative chemical resistance of different classes of coatings such as vinyl, epoxy, chlorinated rubber, and others, should be quite useful to the coatings engineer.

"Comparative coatings charts" is issued by J. Landau Co., Dept. CP, Carlstadt, N. J. When inquiring specify 1409 on form which is located opposite last page.

# CONOFLOW *Shows You* *the Way to* **AUTOMATION**

**HERE'S HOW**

YOUR  
PROCESSING  
EQUIPMENT

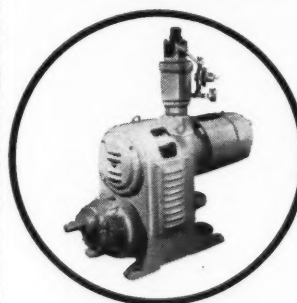


CYLINDER  
CONOMOTOR

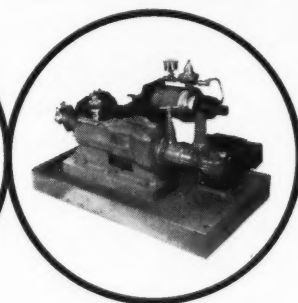
**COST-CUTTING  
= AUTOMATION**

The Conoflow Cylinder Conomotor—a powerful pneumatic actuator—has accelerated industry's approach to the automatic factory and the continuous process plant. A wide range of final control elements, never before available, has been created by the Cylinder Conomotor, a servo capable of following the exact signal outputs of modern electronic and pneumatic instruments.

Cylinder Conomotors, acclaimed by industry as the ultimate in control valve actuators, are fast becoming the standard for automatic control of other process regulating equipment. A few of these are: motor driven speed changers, proportioning pumps, flow regulators, electric timing devices, and numerous electrical systems components such as rheostats, autotransformers and potentiometers.

**A FEW EXAMPLES OF CONOFLOW AUTOMATION...**

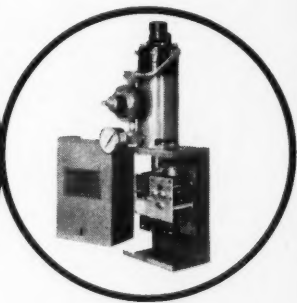
U.S. Electrical Motors  
Variable Speed Drive



Proportioners  
Proportioning Pump



Kates  
Flow Regulator



Dorr-Oliver  
Electric Timer

Conoflow application engineers, well versed in systems engineering methods, will gladly help you evaluate the use of the Cylinder Conomotor on your equipment. Avail yourself of the tremendous advantages offered by this concept of automation, including increased productivity... savings

in man power... improved quality control... and many other benefits. Call or write today for "personalized" service. Conoflow Corporation, 2100 Arch Street, Philadelphia 3, Pa. Representatives in principal cities.

**WRITE FOR BULLETINS B-50-2-A AND EB-2-A**



**CONOFLOW CORPORATION**  
FOREMOST IN FINAL CONTROL ELEMENTS



When inquiring check 1410 opposite last page

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Liquids • Gases • Slurries

WITHOUT CORROSION  
OR CONTAMINATION



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Prices range from .....\$55 to  
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accessory equipment required. \$500

**SIGMAMOTOR Inc.**

18 North Main Street • Middleport, N. Y.

When inquiring check 1411 opposite last page



**Universal  
Pressure  
From 0 to  
250 PSI**

**Without Adjustments  
Without  
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**The UNTRAP  
Steam Trap**

... offers faster warm-up, less wear, lower maintenance,  
and handles more condensate per hour than any bucket trap  
you have ever used. Cuts inventories, too — just order by  
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Let us show you how to get maximum efficiency at lowest  
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When inquiring check 1412 opposite last page

## NEW LITERATURE

### Chemical reactions of fatty alcohols

A very detailed descriptive listing of reactions of fatty alcohols is given in this 16-page book. Over fifty reactions are presented. Technical data on the unsaturated aliphatic and saturated aliphatic alcohols are given, along with the comparison of melting and boiling points of the saturated monohydric alcohols. The bibliography has 70 entries.

Bul No. 907-R is issued by Chemical Products Div., Archer-Daniels-Midland Co., Dept. CP, 700 Investors Bldg., Minneapolis 2, Minn. When inquiring specify 1413 on form opp. last page.

### Industrial X-ray units and uses described

Six different types of radiography units are shown in 12-page booklet containing photos of all units. Characteristics of all types of equipment are listed, and uses are explained. Charts indicate unit to use for various thicknesses of steel and aluminum, penetration values of different alloys and metals, and exposure data for steel. Information is given on industrial image intensifier and closed-circuit television installations.

RC-176 is issued by Instruments Division, North American Philips Company, Inc., Dept. CP, 750 S. Fulton Ave., Mount Vernon, N. Y. When inquiring check 1414 on convenient Reader Service slip on form opposite last page.

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## NEW LITERATURE

### **Illustrates processor of photographic film**

Describing self-contained equipment for processing photographic film, four-page bulletin in two colors suggests technical features and advantages. Application of equipment can be in spectrochemical laboratories, X-ray diffraction laboratories, processing of photomicrographs.

"Photoprocessor" is issued by Jarrell-Ash Company, Dept. CP, 26 Farwell St., Newtonville 60, Mass. When inquiring specify 1415 on form which is located opposite last page.

### **Issues standard for rigid PVC**

Commercial standard for rigid polyvinyl chloride plastic sheets, covering physical, chemical properties, methods of test, and identifying hallmarks is issued in Commercial Standard CS201-55 available at 10c from Office of Technical Services, US Dept. of Commerce, Washington 25, D.C.

### **Glass fiber-epoxy tubing covered in brochure**

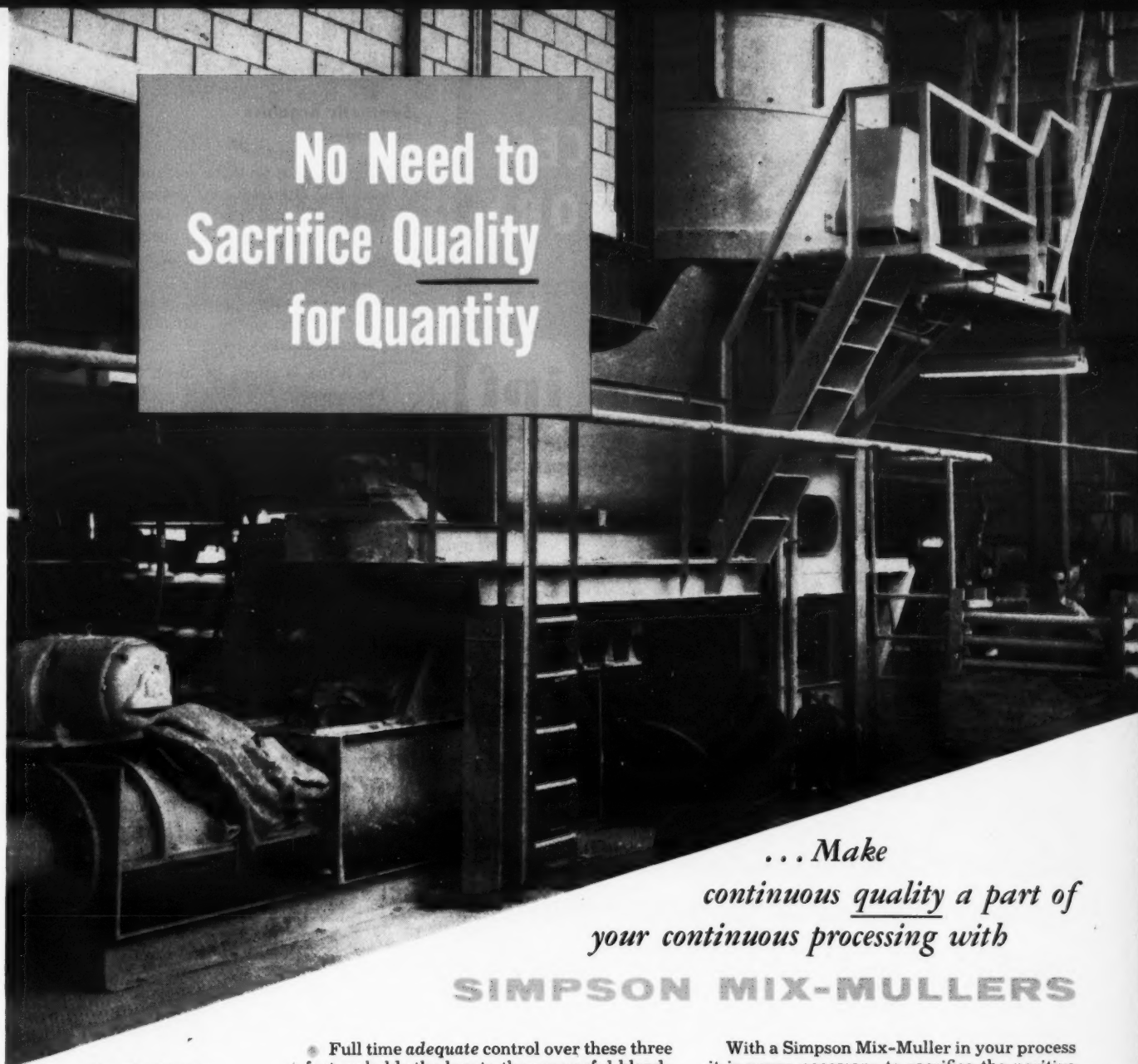
Four-page, illustrated brochure describes a laminated glass fiber-epoxy tubing possessing advantages not previously available in laminates. Twelve features of the tubing, such as its high temperature characteristics and electrical properties, are described.

Bul on glass fiber-epoxy tubing is issued by Lamtex Industries, Inc., Dept. CP, 51 State St., Westbury, L.I., N.Y. When inquiring specify 1416 on form opposite last page.

For more information on product at right, specify 1417 . . . see information request blank opposite last page.



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continuous quality a part of  
your continuous processing with

## SIMPSON MIX-MULLERS

No. 2F Mix-Muller  
(30 cu. ft. capacity)  
arranged to prepare  
ceramic body for pug  
mill and deairing ex-  
truder on continuous  
basis. Overhead  
charging serves mixer.

• Full time *adequate* control over these three factors holds the key to the successful blending of almost *any* kind of ceramic material:

- Accurate proportioning of ingredients.
- Compensation for, or control of ingredient variables.
- Proper moisture content.

If you've had experience with continuous mixing you may have found that the speed you wanted was gained at a loss of control over these factors and perhaps, at a high cost in equipment.

With a Simpson Mix-Muller in your process it is never necessary to sacrifice the positive quality and control over mixing properties obtainable only through batch mixing—for continuous quality, or *quantity*.

The installation above shows how a leading dinnerware producer has arranged his mixing facilities to take maximum advantage of the adaptability of the Simpson Mix-Muller for continuous mixing service. Effective process arrangement is part of the National service . . . at your service.

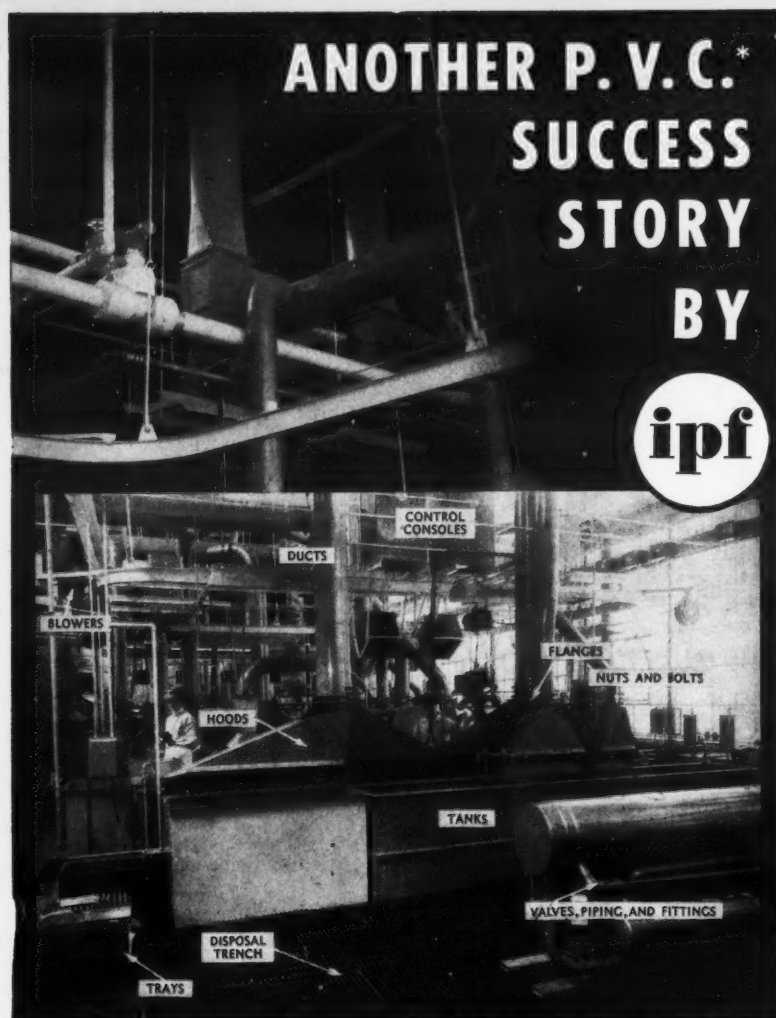
Write for details and remember —  
MIXING IS OUR BUSINESS . . . OUR ONLY BUSINESS FOR OVER 40 YEARS.



## SIMPSON MIX-MULLER® DIVISION

NATIONAL ENGINEERING CO., 640 Machinery Hall Bldg., Chicago 6, Ill.





### Scintilla Division of Bendix Aviation Reports Maintenance-Free P.V.C. Service

*\*Rigid Polyvinyl Chloride (P.V.C.) Fabrication by Industrial Plastic Fabricators — the new material of construction — is being used for 90% of the equipment at Scintilla Division's new Plating Rooms.*

*These facilities, generally recognized as the most modern in the country, have used IPF Products without a single replacement.*

Complete information on P.V.C., "the new material of construction" available upon request.

Plating tanks...stands...exhaust systems...baskets and trays...and drainage troughs were a frequent source of interrupted production when corroded metal equipment needed replacement. Even costly rubber lining of the metal to protect against the acids and corroding fumes did not solve the problem. But — since Scintilla Division's conversion to P.V.C. — no replacements, no slowdowns, no lost time.

IPF blowers, hoods, tanks, ducts, piping systems, valves, nuts, and bolts, and machine parts can also solve your corrosion problems. P.V.C. is a lightweight, smooth surfaced, nonporous, plastic material. Its inherent anti-corrosive qualities insure long life — reduced maintenance costs..

MANUFACTURED BY

**Industrial Plastic Fabricators, inc.**

NORWOOD, MASS.

NORWOOD 7-3411

When inquiring check 1418 opposite last page

### NEW LITERATURE

#### Synthetic organics cataloged

Seventy-seven synthetic organic compounds for use as intermediates, solvents, surface-active agents and fuel gas odorants are cataloged in 12-page booklet that is punched for notebook insertion. Name, description, and suggested uses are presented. Industries for which chemicals are destined: rubber, paper, mining, oil refining, paint, textiles, plastics, agricultural chemicals and pharmaceuticals.

Cat S-101 is issued by Dept. S, Industrial Div., Pennsylvania Salt Mfg. Co., Dept. CP, 3 Penn Center Plaza, Philadelphia 2, Pa. When inquiring check 1419 on form opposite last page.

#### Charts chemicals conveyed by polyethylene pipe

Of particular interest in eight-page bulletin on flexible polyethylene pipe is a chart which lists many chemicals which can be satisfactorily conveyed by the plastic piping. Bulletin includes sizes of piping available, installation instructions, properties, and estimated flow rates.

Bul CE-57 is issued by American Hard Rubber Co., Dept. CP, 93 Worth St., New York 13, N.Y. When inquiring specify 1420 on the convenient Reader Service slip which is located opposite last page.



"How long has this seal been leaking, Joe?"

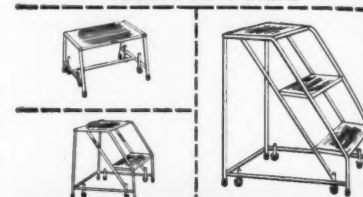
Cartoonist Don Carey works for National Container Corp., Valdosta, Ga.

### ALL ALUMINUM

#### LIGHT WEIGHT RUSTPROOF EASY ROLLING

#### BALLYMORE SAFETY-STEP LADDERS

FROM 1 TO 4 STEPS



Ladder rolls smoothly into position on large casters

Locks to floor automatically when stepped on

Ideally suited for many jobs indoors or out where cleanliness, light weight and smart appearance are important. Sturdy all-aluminum construction reinforced for maximum strength. All parts electrically welded, no rivets or bolts to loosen. Safe, long-wearing, solid rubber-covered steps.

They are easily moved about on rollers but with no danger of "kick-out." Wide-base, rubber-tipped legs grip the floor so ladders are always stable and secure when in use.

Made in four sizes, seven models for average work levels up to 8'. Handrails are offered on the three and four step models for greater safety.

Write for complete specifications to Ballymore Company, West Chester 10, Pa.

**BALLYMORE  
LADDERS**



When inquiring check 1421  
opposite last page

CHEMICAL PROCESSING



## NEW LITERATURE

### Reports Infrared uses in pharmaceuticals

Brochure of four pages outlines uses of infrared spectrophotometry in pharmaceutical industry. History of instrument's use is given from isolation of crystalline sodium benzyl-penicillin in 1942 to present-day practices in research and control. Bibliography of infrared application in pharmaceuticals is included.

Infrared Notes Vol. 2, No. 2 is issued by Beckman Division, Beckman Instruments, Inc., Dept. CP, Fullerton, Calif. When inquiring specify 1422 on form opposite last page.

### Disintegrator applications discussed in bulletin

Illustrated four-page bulletin deals with applications of various models of disintegrators to fine or coarse disintegration and/or mixing of wet dry materials. Uses cover both chemical and food fields. Drawings describe operation of three different machines.

Bul R-507 is issued by Rietz Manufacturing Co., Dept. CP, Santa Rosa, Calif. When inquiring specify 1423 on form opposite last page.

### Data on dihedral coupling

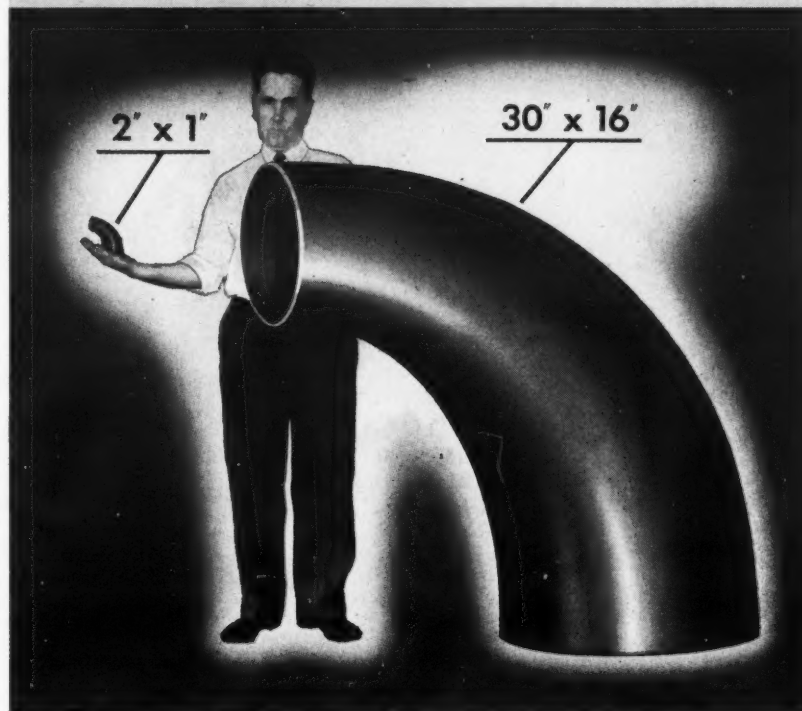
Complete working data on dihedral, flexible coupling are given in eight-page catalog. Subjects include sizes, capacities, and dimensions. How coupling handles angular and offset misalignment up to 12° is explained.

Cat 62 is issued by Ajax Flexible Coupling Co., Inc., Dept. CP, Westfield, N.Y. When inquiring specify 1424 on form opposite last page.

For more information on product at right, specify 1425 . . . see information request blank opposite last page.

# NOW . . . IN STOCK . . . NOT SPECIALS

## MIDWEST REDUCING ELBOWS UP TO 30"



Your demand for Midwest Reducing Elbows has dictated our decision to make them STOCK items in all pipe sizes to 30" OD and all reductions to one-half the nominal pipe size. We now have a modest stock of practically all sizes in standard and extra heavy weight, and this stock is being added to as rapidly as possible.

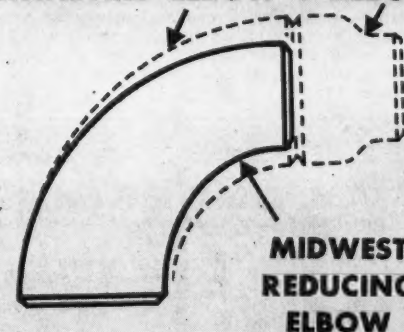
Midwest Reducing Elbows are also made as "specials" in heavy wall and/or any weldable alloy. The fact that our raw material is plate instead of tubing greatly increases our range of wall thicknesses and types of materials . . . it also improves the delivery.

Note the significant advantages of Midwest Reducing Elbows listed below. For further information, get in touch with the nearest Midwest Distributor or write us for Catalog 54.

### ✓ CHECK THESE ADVANTAGES OF MIDWEST REDUCING ELBOWS

- . . ✓ Save more than 1/3 of the welding required by standard elbows and reducers.
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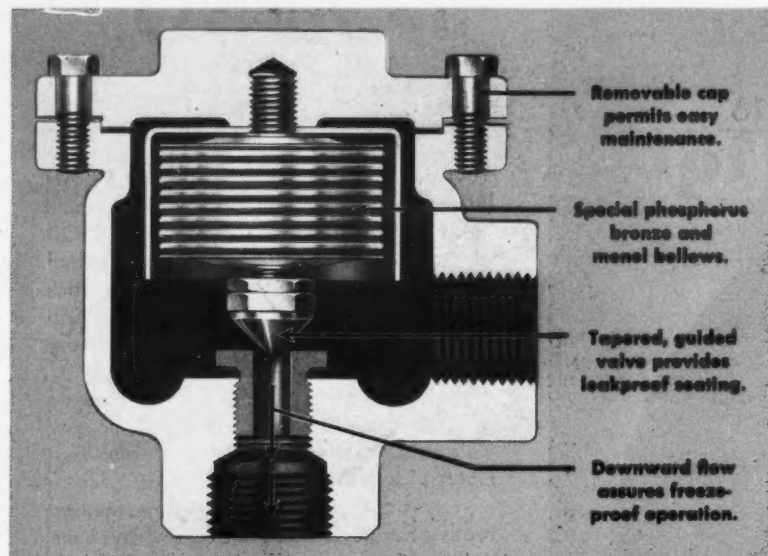
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# ANDERSON PRESENTS...

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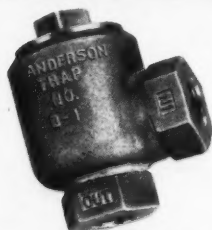


### NEW QUIK-FLEX

#### THERMOSTATIC STEAM TRAPS WITH THE FREEZE-PROOF GUARANTEE!

● Entirely new in design and engineering, here is one of the greatest achievements of all time in industrial thermostatic traps. Anderson's trap designers have engineered a trap that can be *guaranteed freeze-proof*—used with utmost safety in any outdoor or open-sided building installation. In addition, they are made with Anderloy valve and seat designed especially to resist scoring! Specify freeze-proof Quik-Flex Thermostatic Steam Traps.

**THE V. D. ANDERSON COMPANY**  
division of International Basic Economy Corporation • 1942 West 96th Street, Cleveland 3, Ohio



Please send Bulletin 257 describing your new Quik-Flex Thermostatic Steam Trap with the Freeze-Proof guarantee.

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**QUALITY STEAM TRAPS SINCE 1886**

When inquiring check 1426 opposite last page

## NEW LITERATURE

### Presents variety of steel products

Fully illustrated and indexed catalog of 70 pages presents company's complete line of products. Included are special steel items, overhead conveying equipment, processing belts, wire and wire products, industrial screens, and wire fabrics. Coal chemicals and coke are also listed.

Cat G-50 Rev is issued by Colorado Fuel and Iron Corp., Dept. CP, 575 Madison Ave., New York, N.Y. When inquiring specify 1427 on form opposite last page.

### Plastic terminology explained

Over 85 definitions, for such terms as bonding strength, center expansions, delamination, flexural strength, postforming, are listed and explained in this four-page glossary.

"Glossary of Plastic Terms" is issued by The Richardson Co., Dept. CP, 2769 Lake Street, Melrose Park, Ill. When inquiring specify 1428 on convenient Reader Service slip which is located on form opposite last page.

### Institute adopts standard terms

A 12-page booklet containing the standard classification and terminology for power actuated valves provides a practical framework of standard terms for everyday use of operating engineers, instrument engineers, and mechanics. It is expected to clear up existing ambiguities and uncertainties, and provide a broad base for new and accepted names and terms which should be recognized and preserved.

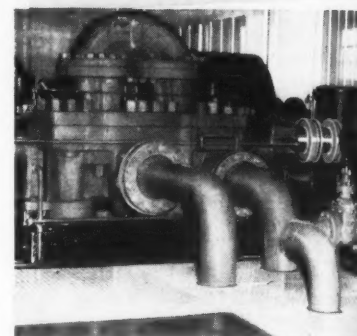
"Standard Classification and Terminology for Power Actuated Valves" is published by Fluid Controls Institute, Dept. CP, Box 191, Decatur, Ill. When inquiring specify 1429 on convenient Reader Service slip opposite last page.

### You must qualify to receive this magazine

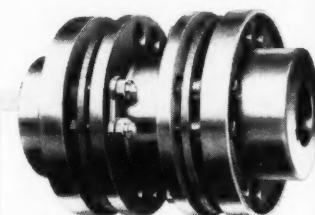
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See page 93

## THOMAS FLEXIBLE COUPLINGS PROTECT Your Pumps



Pump troubles such as replacement of packing and glands are practically eliminated when Thomas Flexible Couplings are used for power transmission.



**UNDER LOAD and MISALIGNMENT ONLY THOMAS FLEXIBLE COUPLINGS OFFER ALL THESE ADVANTAGES.**

- 1 No Cross-pull on Bearings or Gland.
- 2 No End-thrust on Bearings or Impeller.
- 3 Freedom from Backlash—Torsional Rigidity.
- 4 Free End Float.
- 5 Smooth Continuous Drive with Constant Rotational Velocity.
- 6 Visual Inspection in Operation.
- 7 Original Balance for Life.
- 8 No Lubrication.
- 9 No Wearing Parts.
- 10 No Maintenance.

Write for Engineering Catalog 51-A

**THOMAS FLEXIBLE COUPLING CO.**

WARREN, PENNSYLVANIA, U. S. A.

When inquiring check 1430 opposite last page

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JANUAR



### Formulas for solvent-thinned and water-thinned paints

Twenty-four formulas for solvent-thinned paints and 17 formulas for water-thinned paints are featured in 46-page booklet. Each formula sheet is three-hole punched so it can be removed and placed in a binder. Celite diatomaceous silica is defined, and the extra dividends it offers are pointed out.

"Pigment Extenders, Flatting Agents, Filter Aids for the Finishes Industry" is issued by Johns-Manville, Dept. CP, 22 East 40th St., New York 16, N.Y. When inquiring specify 1431 on the convenient Reader Service slip which is located opposite last page.

### Aliphatic nitrogen compounds

Aliphatic nitrogen compounds, derivatives of ammonia in which hydrogen atoms are replaced by organic radicals, are described in detail in this 48-page booklet. Tables and graphs are used to present physical properties, shipping, and other data. Constant-boiling mixtures, specifications, and test methods are given. An extensive bibliography is included with the text. There are 24 charts and five tables in the booklet.

Bul F-4770D is issued by Carbide and Carbon Chemicals Co., a div. of Union Carbide and Carbon Corporation, Dept. CP, 30 E. 42nd Street, New York 17, N.Y. When inquiring check 1432 on form opposite last page.

### Reports extent of research projects for air pollution control

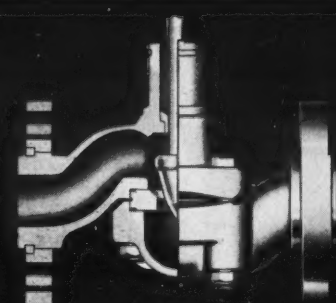
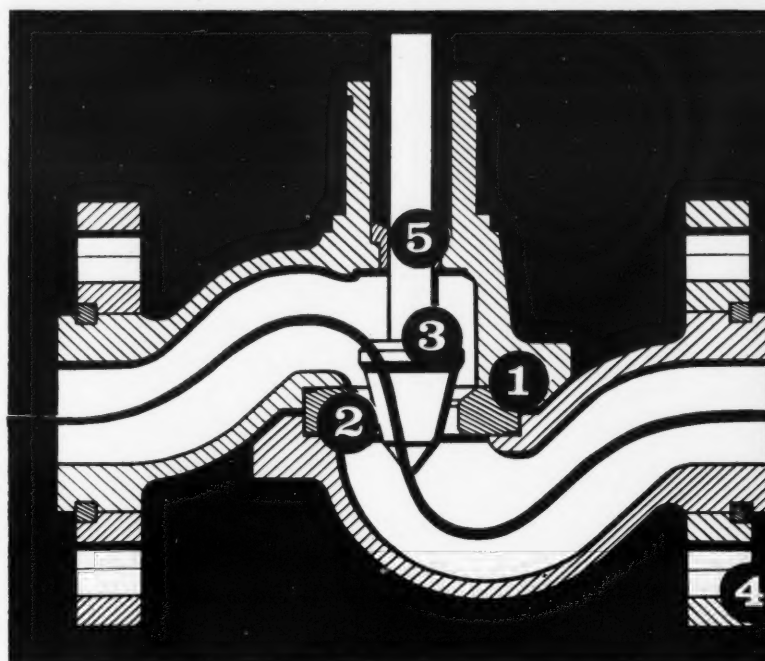
Designed as an aid to engineers, public health officers, scientists, and others interested in air pollution problems, report shows that 68 colleges, universities and research institutes are now carrying on research in air pollution. Research projects described include efforts to control impurities in automobile exhausts, development of various instruments useful in sampling and analyzing atmospheres, measurement and analysis of dust and other impurities in the air, and influence of smog on infections in plants and animals. This is second in series of three air pollution reports. First report, published in July, provided list of instruments and devices useful in study of air pollution.

To obtain "Guide to Research in Air Pollution" remit \$1.50 to Order Dept., The American Society of Mechanical Engineers, Dept. CP, 29 W. 39th St., New York 18, N. Y.

# ANNIN BODY DESIGN

...THE SOUNDEST APPROACH TO TROUBLE-FREE FLUID CONTROL

Reduces body turbulence and erosion • Longer seat ring life—retains tight closure • High lift in all sizes for better control—greater rangeability • Fewer parts—simplified and much lower maintenance.



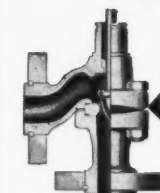
### GLOBE BODY ▲

The basic form of all Annin Valves. Reduces number of parts 50 to 75%, lowers initial costs, saves on parts inventory and maintenance.

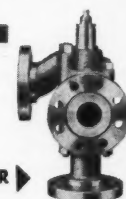
### OTHER BODY DESIGNS PROVIDE FLEXIBILITY IN INSTALLATION



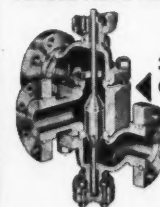
CORNER BODY ▶



ANGLE BODY



3-WAY VALVE-ANGLE ADAPTER ▶



3-WAY VALVE-GLOBE ADAPTER

**1 BODY.** Single seat split body construction eliminates pockets and shoulders...reduces erosion.

**2 SEAT RING.** The body flanges retain seat in perfect alignment with valve plug.

**3 VALVE PLUG AND STEM.** Valve plugs are contoured to provide either linear, percentage, or semi-throttle characteristics...reduce turbulence, wire drawing, plug vibration and noise.

**4 SEPARABLE FLANGES.** Can be interchanged at will. Carbon steel flanges can be mounted on alloy bodies for economy.

**5 PLUG GUIDE.** Hard metal guides of close tolerances can be inserted through stuffing box without resorting to threads, welding, pressing or staking.

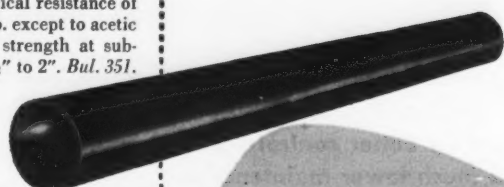
Annin Valves are the answer to the complex fluid control problems common in the process industries—Chemical, Petroleum, Paper, Steam, Power Plants, and many others. Today, Annin Valves are recognized by control engineers and valve designers as the outstanding valve development of the past twenty-five years for the control of hot, cold, erosive, or viscous liquids.

**ANNIN** THE ANNIN COMPANY  
6370 EAST TELEGRAPH ROAD, LOS ANGELES 22, CALIFORNIA  
*Control* VALVES

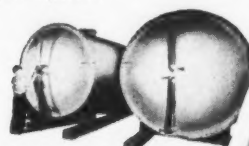
When inquiring check 1433 opposite last page

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AT SUB-ZERO TEMPERATURES**

ACE PARIAN . . . odorless, tasteless, rigid polyethylene. Best chemical resistance of any plastic at room temp. except to acetic acid. Excellent impact strength at sub-zero temp. Rigid pipe 1/2" to 2". *Bul. 351.*



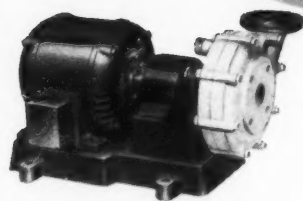
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ACID STORAGE TANKS**  
*Rubber-lined by ACE  
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Economical, universal protection against all alkalis, metallic salts, practically all inorganic acids, hydrochloric acid any strength, sulphuric to 50%, nitric to 20%, phosphoric to 75%. Good to 160 deg. F. . . . sometimes higher. Soft rubber interlayer aids shock resistance.

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ACE Materials to  
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CORROSION**

Eleven job-proved rubber and plastic materials now available in ACE piping, valves, pumps and tanks. Tough Ace-lite rubber-plastic blend . . . heat-resistant Tempron . . . Saran PVC . . . many others. Write for comparative properties Bulletin CE-50 . . . or call your American Hard Rubber Company distributor.



**ACE "WAM" . . . THE FINEST  
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On job after job, this 80-gpm. centrifugal pump has earned highest praise. Hard rubber casing and impeller, Hastelloy C shaft. Handles nearly all corrosives. Mechanically simple, trouble-free. *Bulletin CE-55.* Larger ACE pumps available.



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If you want life-time corrosion protection for special parts needed in quantity . . . we may save for you by molding them of Ace hard rubber or plastics to your most exacting requirements. Our facilities among world's largest. Ask for recommendations.

**ACE** processing equipment of rubber and plastics

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93 WORTH STREET • NEW YORK 13, N. Y.

When inquiring check 1434 opposite last page

**NEW LITERATURE**

**Five major chemical processes  
reviewed in 12-page catalog**

Plants for the manufacture of alkyd resins, fatty alcohols, phenolic resins, and maleic anhydride, and for fatty acid hydrogenation are described in 12-page brochure. Particular attention is given to the variables and factors which are most critical to efficient and economical operation. Typical flow sheets, piping layouts, equipment designs, and installations are illustrated.

Catalog is issued by Industrial Process Engineers, Dept. CP, 8 Lister Avenue, Newark 5, N. J. When inquiring specify 1435 on form opposite last page.

**Glycerine: terms and tests,  
properties and uses**

Two digest-size bulletins supply comprehensive data about glycerine. "Glycerine Properties and Uses" is a handy reference to this compound's role in industry. Glycerine's chemistry and properties and its function in its principal industrial application are covered. "Terms, Tests, and Technical Data" defines grades; US and British specs are given and explained, and test methods are covered in detail. Both booklets are 20 pages long and are issued by Glycerine Producers' Association, Dept. CP, 295 Madison Ave., New York 17, N.Y. When inquiring check 1436 opposite last page.



**BASIC  
FACTS**

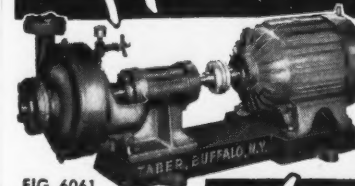


FIG. 6061

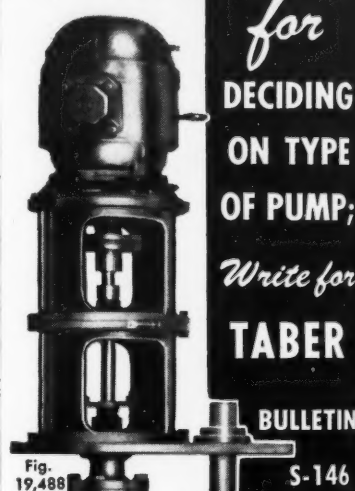


Fig. 19,488

**for  
DECIDING  
ON TYPE  
OF PUMP;  
Write for  
TABER**

**BULLETIN  
S-146**

**Practical  
GUIDE TO  
PUMP  
SELECTION**

Big illustrations and brief descriptions with capacities and adaptability of pumps are contained in this unbiased compilation of facts to help avoid costly misapplication. Bulletin S-146.

**TABER PUMP CO.**  
Est. 1859  
320 Elm St.  
Buffalo 3,  
N. Y.

**TABER**

When inquiring check 1437  
opposite last page

CHEMICAL PROCESSING



**Heavy-duty cleaner for metals,  
textiles: sodium orthosilicate**

Sodium orthosilicate offers advantages in electrolytic and spray cleaning of metals as it has high electrical conductivity, good emulsification and saponification characteristics, — high pH, and acid capacity, according to this 12-page bulletin. Laundry applications, where the compound neutralizes acidic materials and maintains more alkalinity than soap, are also reviewed.

"Dow Sodium Orthosilicate" is issued by The Dow Chemical Co., Midland, Michigan. When inquiring check 1438 on form opp. last page.

**Booklet about installing  
plastic-coated raceways**

Step-by-step illustrated installation details for plastic-coated raceways are given in 14-page, pocket-size booklet. How to obtain maximum protection and efficiency from plastic-coated rigid steel conduit and electrical metallic tubing is revealed.

Bul 18-166 is available from Construction Materials Div., General Electric Co., Dept. CP, Bridgeport 2, Conn. When inquiring specify 1439 on form opposite last page.

**Comprehensive data presented  
for metallic bellows**

Valuable information on applications, design considerations, and standards for metallic bellows is presented in 20-page illustrated catalog. Pictures, tables, and charts implement written data to adequately describe metallic bellows and their uses. 22 x 17" fold-out chart gives paper pressure-temperature curves for 24 organic compounds including Freon 12 and 22, sulphur dioxide, and xylene.

Cat 155 is issued by Flexonics Corp., Dept. CP, Maywood, Ill. When inquiring specify 1440 on form opposite last page.

**Linear programming problems  
and how to solve them**

Analog computer techniques, and procedures for solving linear-programming problems are detailed in five-page technical article.

Technical article reprint 110 is issued by Reeves Instrument Corporation, subsidiary of E. 91st St., New York 28, N.Y. When inquiring specify 1441 on form opposite last page.

**Can you "pay for"  
a magazine like this?**  
.....  
**with a \$3.00 or \$5.00  
subscription?**

**This magazine costs more than \$40.00 per year**

Maybe you've thought publishers make money on a \$3.00 or a \$5.00 subscription...  
that that is why they ask you to subscribe.

**No, it's not true...** your \$3.00 or \$5.00 fall far short of "paying" for any really good business magazine.

The costs of printing, paper and postage alone usually exceed subscription prices. Editorial costs and other expenses run to many times that amount. And usually it costs more just to sell such subscriptions than they bring the publisher in dollars. So, the publisher actually "loses money" on such sales.

**Then, why?**... yes, why do some publishers charge a nominal rate for a subscription... but other publishers send their magazines without charge?

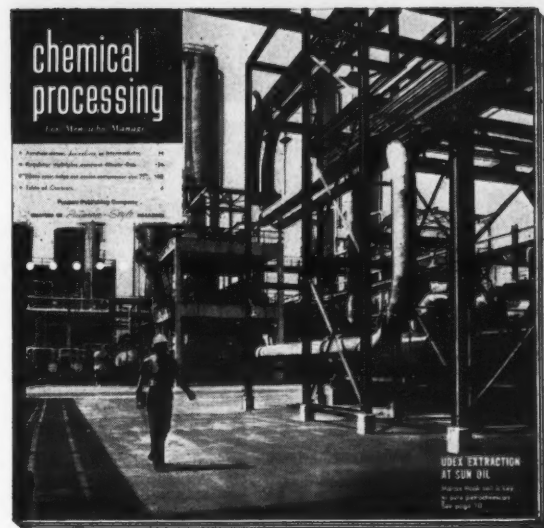
Well, the "paid-subscription" magazine gets a lower postage rate than does the "non-paid subscription" magazine. Some publishers feel this postal advantage is important. So they charge a "token fee" as a subscription price. And so win a lower postage rate.

But—whether you pay nothing, or such a "token fee," you — the reader — do not really pay for the magazine's service.

**No—advertisers pay the bills...** and so, logically, advertisers demand the best possible coverage of the important, key men of the field. That means folks like you, who exercise buying power.

**CHEMICAL PROCESSING "hand-picks" its readers—for best, effective circulation...** and sends the magazine to these key folks, without charge.

You see, you simply can't get maximum coverage of important folks by trying to force them to buy subscriptions. Such men, limited in numbers, are scattered all over the U.S.A.; travel and/or direct mail, cost money; a large share "forget to renew" each year; and, no matter how much time, money, and pressure you put on them, there are always some important men who will never buy.



**You don't "pay"—CHEMICAL PROCESSING gets better circulation.** So, as you can see, a subscription price is at best but a "token payment." You don't really pay for any magazine with \$3.00 or \$5.00.

But, CHEMICAL PROCESSING gets the best, most effective circulation coverage by "hand-picking" the right readers. This gives values to advertisers which they can't possibly get in any other way.

**That's why...** CHEMICAL PROCESSING hand-picks only qualified readers... Men Who Manage chemical processing plants... presidents, partners, plant managers, foremen, engineers, chemists, directors of research, etc. Then the editors make the magazine so interesting, so valuable, these folks want to read it.\*

That's why CHEMICAL PROCESSING spends many thousands of dollars on each issue — to give you this service costing more than \$40.00 per year... without charge... as you are an important reader in the chemical field.

No, you can't "pay for" any good business magazine with \$3.00 or \$5.00. Whether you receive a "paid magazine" or a "non-paid magazine" you are still enjoying a valuable service — whose cost is far above any price you paid for a subscription.

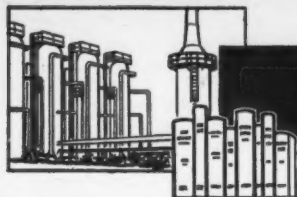
*\*Every issue proves this qualified readership... by unequalled response from these key readers. May we show you the evidence?*

**Chemical Processing**

published by: Putman Publishing Company

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FOOD PROCESSING  
FOOD BUSINESS  
INDUSTRY POWER  
"Executive Magazines for Industry"





# processing and engineering data

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## Vapor Pressures of Media for Temperature Sensing Devices

Data courtesy FLEXONICS CORP., Maywood, Illinois

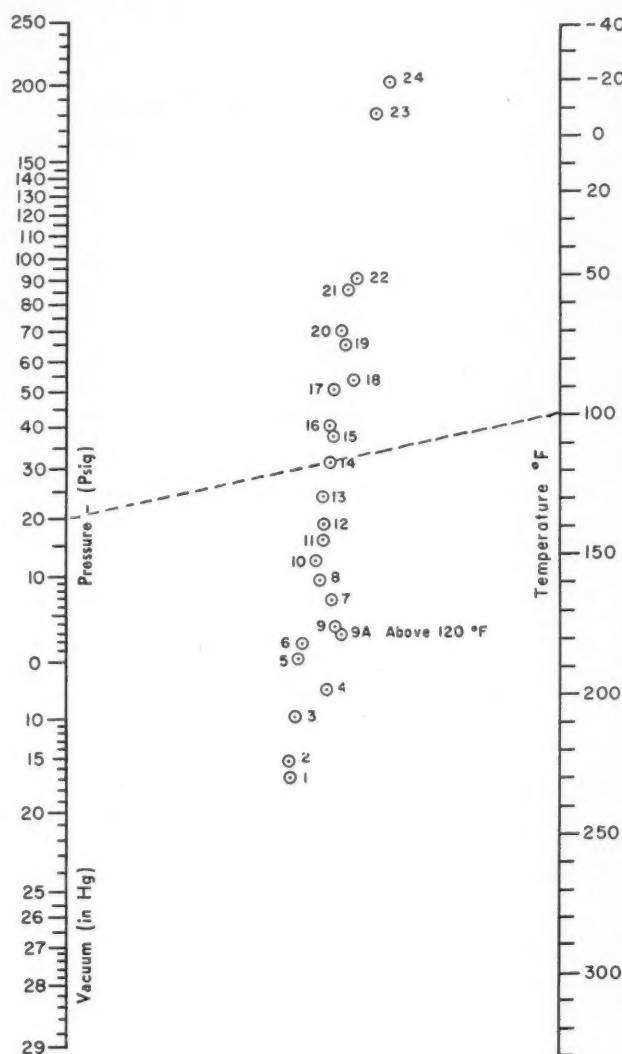
Nomograph by BILL SCHREMP, Assistant Editor

Accompanying chart offers convenient method of finding vapor pressures at various temperatures for media commonly used in vapor-pressure actuated temperature sensing devices.

### Typical Example

To find vapor pressure of ethyl chloride at 100°F connect known temperature, 100°F, with point 14. Line will intersect with vapor pressure scale at 20 psig.

1. Xylene
2. Monochlorobenzene
3. Toluene
4. Water
5. Trichloroethylene
6. Benzene
7. Methyl alcohol
8. Acetone
9. Ethyl alcohol
10. Trichlorotrifluoroethane-Freon 113
11. Methylene chloride
12. Ethyl ester
13. Trichloromonofluoromethane-Freon 11
14. Ethyl chloride
15. Dichlorotetrafluoroethane-Freon 114
16. Butane
17. Isobutane
18. Sulphur dioxide
19. Methyl chloride
20. Dichlorodifluoromethane-Freon 12
21. Propane
22. Monochlorodifluoromethane-Freon 22
23. Ethane
24. Carbon dioxide



## FOR MAXIMUM SAFETY

all over your plant use

Safety GRIP-STRUT

Pat. Pending

the new basic material, all in one piece (including channels), not welded, riveted or expanded in steel or aluminum, in standard sizes and gauges. Safety GRIP-STRUT presents an open space, in a diamond pattern, in excess of 55% of the area for ready access of light and air and gives a positive non-slip footing in all directions. Ideal for work platforms, stair and ladder steps, flooring, balconies, catwalks, machinery guards, fire escapes and for original equipment safety treads.



Work Platforms



Flooring



Machine Guards



Balconies

### Important Safety Features

- ★ Fire proof
- ★ Slip proof
- ★ Maximum strength
- ★ Minimum weight
- ★ Easy to stand on
- ★ Cool in summer — warm in winter

### Big Economy Features

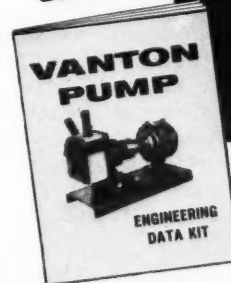
- ★ For balconies — no extra light needed below — no extra heat.
- ★ No extra supports necessary — channels are integral part of the material
- ★ No secondary sprinkler heads needed
- ★ Self-cleaning
- ★ Cut and installed like lumber by your own maintenance force
- ★ Low in original cost

Distributors in all principal cities. Consult yellow pages in phone book under "GRATING."

**GRIP-STRUT division**  
THE GLOBE COMPANY • Manufacturers since 1914  
4006 S. PRINCETON AVE. • CHICAGO 9, ILL.

When inquiring check 1442 opposite last page

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## SOLVE PUMPING PROBLEMS

NO STUFFING BOX OR SHAFT SEALS

VANTON PUMP eliminates packing problems in handling corrosive or abrasive liquids. Liquid flows in channel between molded plastic body and synthetic liner. Ideal for lab, pilot plant, and full-scale production use. A full-time production tool in the 13-20 GPM range.

ENGINEERING DATA KIT contains sizes, pumping and performance data, body and liner materials, selection chart; typical hookups, prices, operating data—all the info. you will need to solve your pumping corrosion and packing problems.

### GET THE FACTS! SEND COUPON!

Vanton Pump & Equip. Corp., Hillside, N. J. Dept. CPQ-1

Division of Cooper Alloy Corp.

Please send further info. on Vanton pumps.

My pumping problem is:

NAME \_\_\_\_\_  
TITLE \_\_\_\_\_  
COMPANY \_\_\_\_\_  
STREET & NO. \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_

When inquiring check 1443 opposite last page

CHEMICAL PROCESSING



**Wanted: Nomographs!****Each could earn \$20!**

Do you have a pet nomograph that could save time for other CHEMICAL PROCESSING readers? Send it to:

DATA EDITOR  
CHEMICAL PROCESSING  
111 E. Delaware Place  
Chicago 11, Illinois

CHEMICAL PROCESSING pays \$20 for each one accepted and published.

**Supplies technical data on lithium metal**

Four-page technical data sheet covers typical analysis, physical properties, handling and storage, container materials, dispersions, and uses of lithium metal. Information on availability is included.

Tech Data on Lithium Metal is issued by Foote Mineral Company, Dept. CP, 18 W. Cheltenham Ave., Philadelphia 44, Pa. When inquiring specify 1444 on form opposite last page.

**Molded plastics for automotive and electrical uses**

Eight-page manual discusses advantages of molded plastics for automotive, electrical and other applications. Case histories of 12 different applications are reviewed. Special section gives picture-definition of difference between "thermosetting" and "thermoplastics", plus series of "right way" and "wrong way" sketches to aid designer of molded plastic parts. Full-page chart details properties of 13 different materials and suggests typical applications for each.

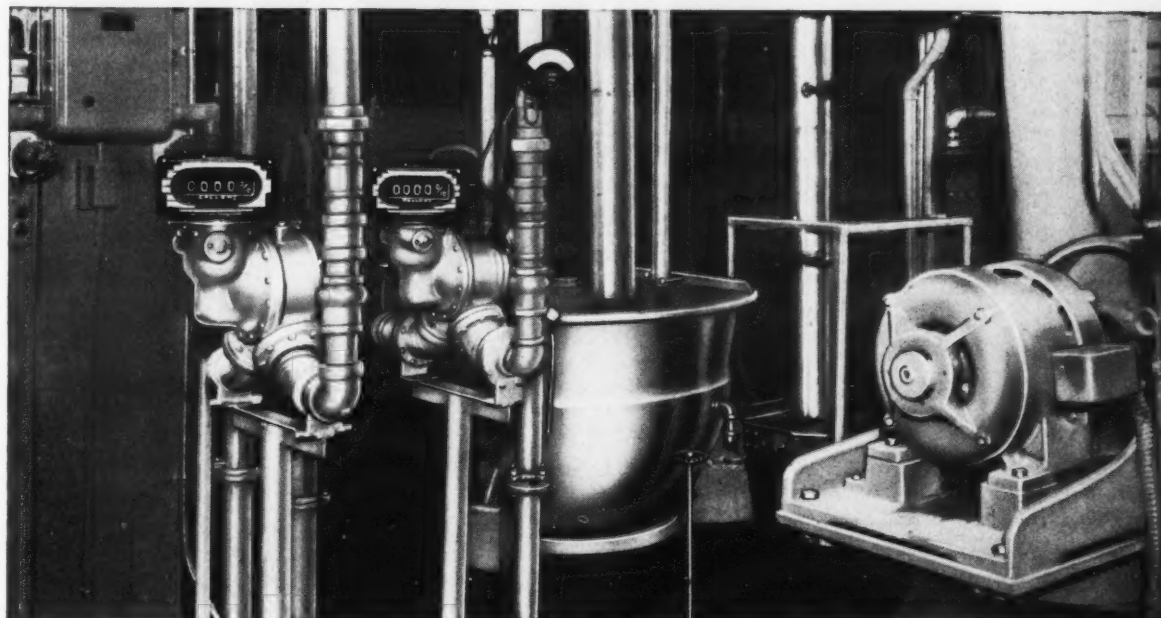
"Molded Plastics" is issued by The Richardson Company, Dept. CP, 27th Ave. and Lake St., Melrose Park, Ill. When inquiring check 1445 on form opposite last page.

**Explains applications of chlorine as germicide and sanitary agent**

Use of chlorine as effective germicide and sanitary agent for various application, is explained in 28-page, pocket-size booklet. Detailed solution tables are included.

"How to Use Pitchlor" is issued by Columbia-Southern Chemical Corporation, Div., Pittsburgh Plate Glass, Dept. CP, 632 Fort Duquesne Blvd., Pittsburgh 22, Pa. When inquiring specify 1446 on form opposite last page.

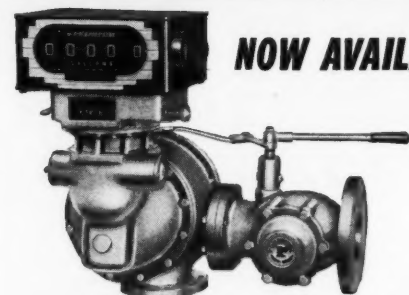
# Rockwell Stainless Steel Meters

**MEASURE CORROSIVE LIQUIDS—FAST!****For Foods, Pharmaceuticals, Chemicals and Liquors**

These Rockwell meters are constructed *inside and out* of stainless steel. With them you can get positive liquid accounting over a multitude of fluids that cannot be measured by ordinary meters. You can use them *with profit* to cut liquid handling and processing costs, to guard the quality of your end products, to stop losses. And your accountants will welcome these meters for cost control and tax analysis purposes. Get full facts now. Use the handy coupon—or write for bulletins.

**Use For All These Purposes**

- Liquid Delivery Control
- Formula Control—Cost Control
- Product Quality Control
- Departmental & Inventory Control

**NOW AVAILABLE**

**Automatic Pre-Set Meter Shut-off** *without shock.* All stainless construction. Just pre-set the quantity to be measured, then meter and automatic valve take over to shut-off flow in three (3) smooth successive stages without harmful hydraulic shock.

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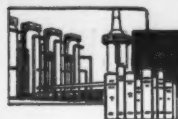
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Pittsburgh 8, Pennsylvania Dept. 106A

Gentlemen:

I am interested in measuring \_\_\_\_\_ (Name of Liquid)  
Pipe Size \_\_\_\_\_  
Working Pressure \_\_\_\_\_ psi Temperature \_\_\_\_\_ °F max.  
Max. Flow Rate \_\_\_\_\_ gpm Min. Flow Rate \_\_\_\_\_ gpm  
YOUR NAME \_\_\_\_\_  
COMPANY \_\_\_\_\_  
STREET \_\_\_\_\_  
CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_



When inquiring check 1447 opposite last page



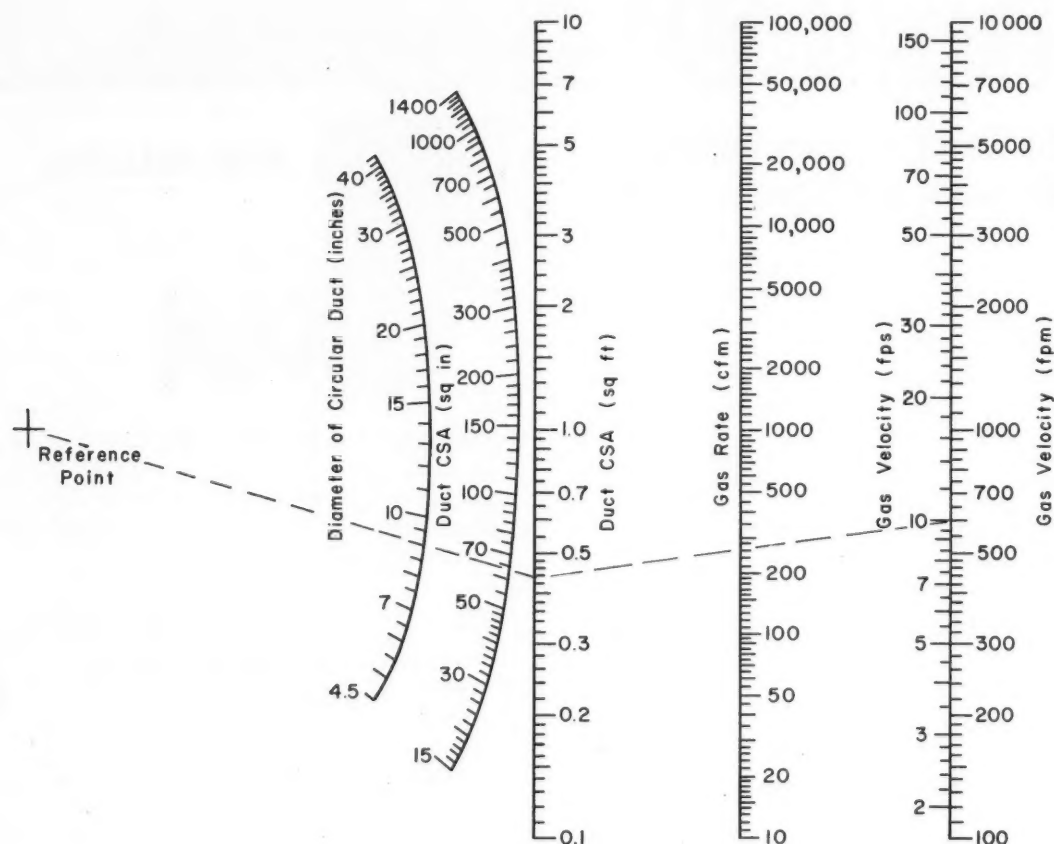
## Gas Flow Rate

by W. J. BAILEY  
Illinois Testing Labs, Inc.

This nomograph offers a convenient means of estimating flow rate of a gas in system when duct size and velocity are known. It can obviously be used to size circular or rectangular ducts for specific volumetric rates or velocities.

### Typical Example

Line is drawn from reference point through known duct diameter of nine inches (or through scale showing cross sectional area of duct), intersecting sq ft area scale at 0.44. From this point line is drawn to gas velocity scale, intersecting at known velocity of 10 fps. Gas flow rate is indicated at intersection on gas rate scale, 260 cfm.



## What's a "New Solution"?

It's an article in  
**CHEMICAL PROCESSING**  
describing a new way of solving  
a tough plant operating problem.

In each issue you will find  
specific "case histories" showing  
how these processing problems  
were solved.

Each article states the  
operating problem . . .  
explains the process used  
and gives details of how problem  
*was solved* . . . shows results secured.

Take a look at "New Solutions"  
articles in this issue —  
they might suggest a "solution"  
for some of your tough  
processing problems.

CUT HERE AND FILE



## Fertilizer Picture in '57

(Continued from page 29)

require much greater capital outlay than the older plants since most of the granulation processes are designed for continuous operation and require wet mixing, drying, and cooling equipment.

### Higher Analysis Fertilizers

The trend toward higher analysis fertilizers continues. In 1955 the average plant food content of all mixed fertilizers used in the United States was 27.9 percent as compared with 23.6 percent in 1950 and 19.9 percent in 1940. The concentration of plant food in direct-application fertilizers has increased similarly. The reasons for this lie in freight and distribution economies.

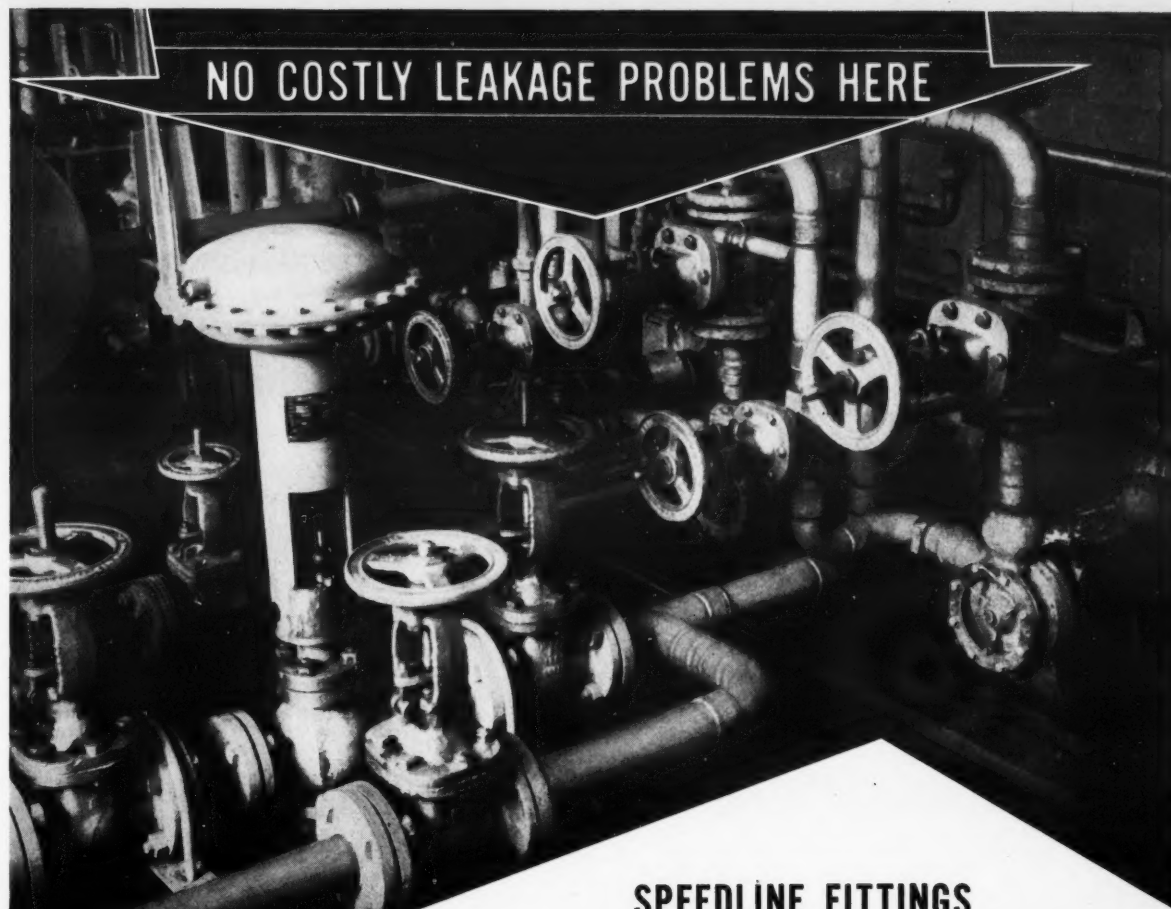
This trend is expected to continue and will mean increased production of higher analysis materials (such as urea, ammonium nitrate, triple superphosphate, and calcium metaphosphate), and decreasing production of lower analysis materials (such as ammonium sulphate and ordinary superphosphate). This demand for high analysis accentuates the use of granulation processes which are better able to use the high analysis materials to produce satisfactory products.

### Fertilizer Solubility and Time of Application

There is a growing appreciation of different degrees of solubility and availability of the individual plant foods, and of the desirability of using the proper degree of solubility for different applications. For example, if water-soluble nitrogen is applied too far in advance of the actual need by the plant, much of the nitrogen may be lost through leaching and run-off from the soil. This can be overcome either by proper time of application or by use of a water-insoluble yet available form of nitrogen.

Similarly, it has been shown that phosphate in the water-soluble form responds better for starter fertilizers than citrate-soluble forms. On the other hand, for a large proportion of the phosphate fertilizer needs, citrate-soluble rather than water soluble  $P_2O_5$  is equally as effective and in some instances more effective. State laws require specifications of only total nitrogen and available  $P_2O_5$ . It can be expected that agronomic recommendations for the kind of solubility desired for each special application will result in the manufacture of fertilizers with guarantees as to the degree and kind of solubility.

General Electric has received an order from Diamond Alkali for installation of nation's largest germanium power rectifier system. Installation will be at Deer Park plant near Houston, Texas.



## SPEEDLINE FITTINGS MAKE THE DIFFERENCE AT WYETH!

"Hard to hold" process solvents and penicillin broth posed a vital piping problem for plant engineers at the Wyeth Antibiotic Laboratory, in West Chester, Pa. Then Wyeth engineers got the complete story on Speedline Fittings, especially designed for Schedules 5 and 10 stainless steel process piping installations. The result? No leakage problems after more than three years' continuous plant operation with a Speedline piping system... substantial savings in piping installation time and costs!

Unique features of Speedline Stainless Steel Fittings permitted easier, faster assembly of leak-proof joints at every phase of this complicated piping layout. Speedline Aligning Connectors allowed "in place" pre-assembly for alignment

prior to welding. Speedline's exclusive "tangential feature"—the additional straight section on every end of every formed fitting—permitted maximum clearance for welding with or without connectors... allowed direct attachment of flanges to fittings for valve installations even in the most confined areas. Design hours were saved, assembly time reduced... and total costs lowered.

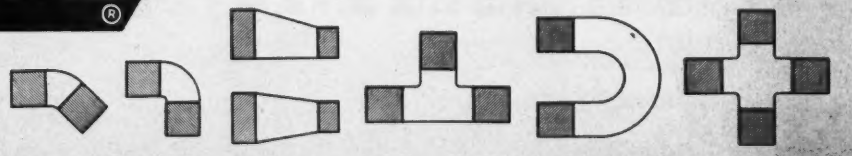
If leakage is a problem in your process operations... or if greater design flexibility and economy could improve your process piping installations... why not get the complete story on Speedline Fittings for yourself. It's available in a fully illustrated catalog, yours at no obligation. Write for a copy today.



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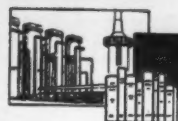


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**SPEEDLINE STAINLESS STEEL FITTINGS**—the newest thing in pipeline economy  
Manufactured by **HORACE T. POTTS COMPANY** • 502 E. Erie Avenue • Phila. 34, Penna.

When inquiring check 1448 opposite last page



## Viscosities of Methyl Cellulose and Natural Gums

by D. S. DAVIS  
Professor of Engineering  
University of Alabama

Nomograph<sup>1</sup>, based on reliable data<sup>2</sup>, permits accurate and convenient estimation of viscosities of aqueous solutions of methyl cellulose and of natural gums at 20°C.

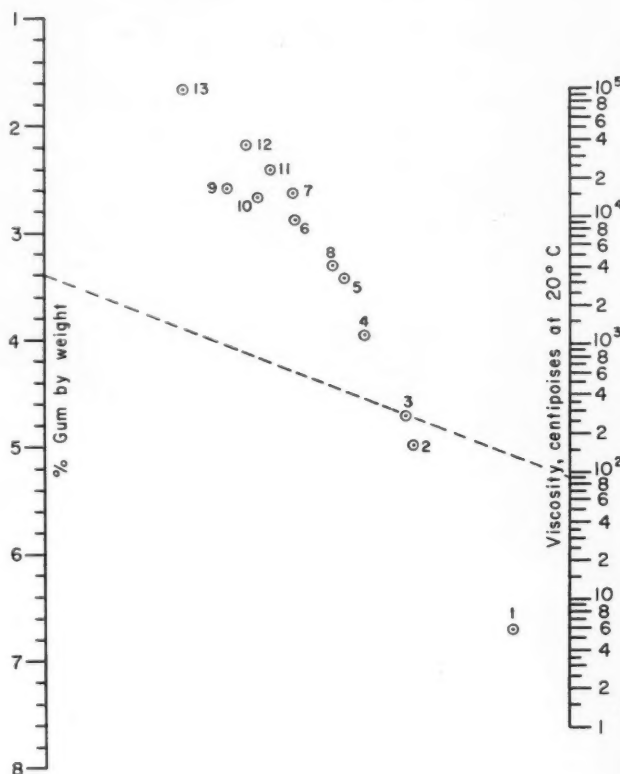
### Typical Example

What is the viscosity of a 3.4% solution of a "25-cp" methyl cellulose at 20°C? As shown by the broken line, connect 3.4 on the percentage scale with 3, the proper gage point for the solution in question, and note the intersection with the viscosity scale at 90 centipoise. Various methyl celluloses are designated by numbers that represent the viscosities of their 2% solutions.

### LITERATURE CITED

- (1) DAVIS, D. S., "Nomography and Empirical Equations," Ch 10, Reinhold Publishing Corporation, New York, (1955)
- (2) MANTELL, C. L., "The Water-Soluble Gums," p 149, Reinhold Publishing Corporation, New York, (1947)

1. Arabic (acacia)
2. 15-cp methyl cellulose
3. 25-cp methyl cellulose
4. 100-cp methyl cellulose
5. 400-cp methyl cellulose
6. 1500-cp methyl cellulose
7. 4000-cp methyl cellulose
8. Carageen (Irish moss or chondrus)
9. Gum Karaya
10. Quince seed
11. Locust bean gum (fine grind)
12. Locust bean gum (coarse grind)
13. Gum tragacanth (No. 1 white ribbon)

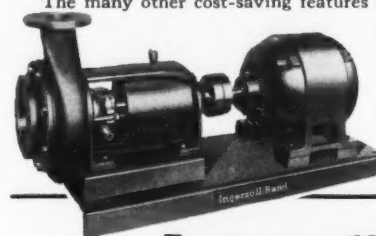


## MAINTENANCE HITS A NEW LOW

when you install  
I-R Chemical Pumps

That's because they're built for easy maintenance—and less of it! All parts are ruggedly constructed to last longer on the job. And easy access for inspection or servicing means less down-time—more earning time on every job. The exceptional corrosion resistance of Ircamet, or other special materials used, assures maximum pump life in tough chemical-handling service. The short, rigid, ball-bearing-mounted shaft prevents impeller whip and eliminates stuffing-box troubles. What's more, I-R chemical pumps are protected against leakage with the Leakollector stuffing-box gland and Cameron Shaft Seal.

The many other cost-saving features of these pumps are fully described in Bulletin No. 7095-A. Ask your nearest I-R engineer for a copy.



**Ingersoll-Rand**

10-207 Cameron Pump Division  
11 Broadway, New York 4, N. Y.

PUMPS • CONDENSERS • TURBO-BLOWERS • COMPRESSORS • AIR & ELECTRIC TOOLS • ROCK DRILLS

When inquiring check 1449 opposite last page

### CORROSION YOUR BIG PROBLEM?

New 60-page booklet gives complete facts on

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**STAINLESS STEEL TUBING & PIPE**

- ANALYSES
- APPLICATIONS
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Write for  
Booklet  
STP-1

Protect your electrical wiring in highly corrosive locations with Republic "Dekor®-Coated" E.M.T. Booklet DEK-3 tells how. Write for it.



**REPUBLIC STEEL**

STEEL AND TUBES DIVISION  
207 East 131st Street • Cleveland 8, Ohio



When inquiring check 1450 opposite last page

CHEMICAL PROCESSING



## Outlook for Rubber Industry

(Continued from page 39)

big business; so is the closely-related production of rims, wheels and brakes for both ground vehicles and aircraft.

Rubber and synthetic films are finding manifold uses because of their moisture- and air-proof qualities which protect and preserve red meats and other perishable foodstuffs, and also provide ideal packaging for many industrial products.

Foam rubber products are providing greater efficiency and comfort in our everyday life and their use is increasing by leaps and bounds, particularly for automobile seating and in the furniture industry. It is interesting to note that about 6% of all rubber today goes into the foam rubber category.

Vinyl and rubber flooring markets are expanding in both homes and industry. Improved quality, plus new color and style appeal, are giving impetus to this field.

The manufacture of chemicals is one of the fastest-growing categories of the industry. We are producing new and better types of synthetic rubber, enlarging production facilities and are supplying latices and resins for many products in such industries as rubber, paper, paint, plastics, and textiles.

Rubber and plastics today lend themselves to much more flexibility in application, as well as greater eye-appeal through styling, and today there are many products available in attractive colors in the automotive field, shoe products, and others.

### Other Developments

Other aspects of the rubber industry are interesting and inspiring to contemplate. Research carries us into many fields, including the development of new weapons and items for the government, many of them classified.

Among the interesting developments in rubber, we can look forward to greater use of vibration dampers for machines and vehicles which prolong the life of equipment and add more comfort to driving; rubber spring suspensions to replace steel springs; rubber sidewalks, rubber in roads — many others. Of course, improvements in tires are constantly developing to make driving safer and more economical.

To sum up, assuming there will be no serious international upheavals, I would say that the rubber industry is prepared to play its important part in a forward surge of progress and prosperity the like of which the world has never seen before.

We look for a continued high demand for products of quality, and the industry has expanded its production facilities to take care of this demand.

The spur of the American competitive system is a challenge to us to keep pace with the needs and wants of customers everywhere, at the same time keeping a checkrein on prices, so as to provide the greatest possible values.



(Courtesy A. H. Mathieu & Company)

## MANHATTAN Rubber Linings Assure Permanent Protection against Corrosion, Contamination, Abrasion

You get real protection . . . permanent, positive protection against losses due to corrosion, contamination and abrasion with Manhattan Rubber Linings. That's because Manhattan engineers have developed a special method of bonding rubber to metal so securely that actual on-the-job tests have proved it can't be separated! Manhattan Rubber Linings are made from thick, calendered sheets of natural or synthetic rubber, whichever is best suited, for maximum durability. They expand and contract with the metal under temperature changes—won't harden or crack. Their resistance to most acids, caustics and alkalis is as permanent as it is possible to make them.

To make certain your Manhattan Rubber Lining is flawless and permanent, every Manhattan Lined Tank is tested under high voltage to detect any possible imperfections. More than 60 years of research and manufacturing "know-how" at Manhattan have led to the development of many high quality linings . . . each designed for specific application. Regardless of the size or shape of your processing equipment, Manhattan has the facilities to handle your job . . . the most modern and complete available today. Equipment too large to be shipped can be field lined and vulcanized by skilled Manhattan crews. For rubber lining that lasts longer, contact an R/M representative at the Manhattan Rubber Lining plant nearest you.

RM 621

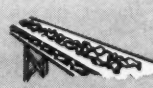
RUBBER LINING PLANTS AT PASSAIC, N. J. and NORTH CHARLESTON, S. C.  
MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY  
**RAYBESTOS-MANHATTAN, INC.**



Flat Belts



V-Belts



Conveyor Belt



Hose



Roll Covering



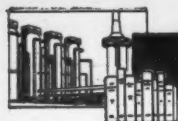
Tank Lining



Abrasive Wheels

Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings • Asbestos Textiles • Packings • Engineered Plastic, and Sintered Metal Products • Laundry Pads and Covers • Bowling Balls

When inquiring check 1451 opposite last page



## Viscosity Conversion Chart

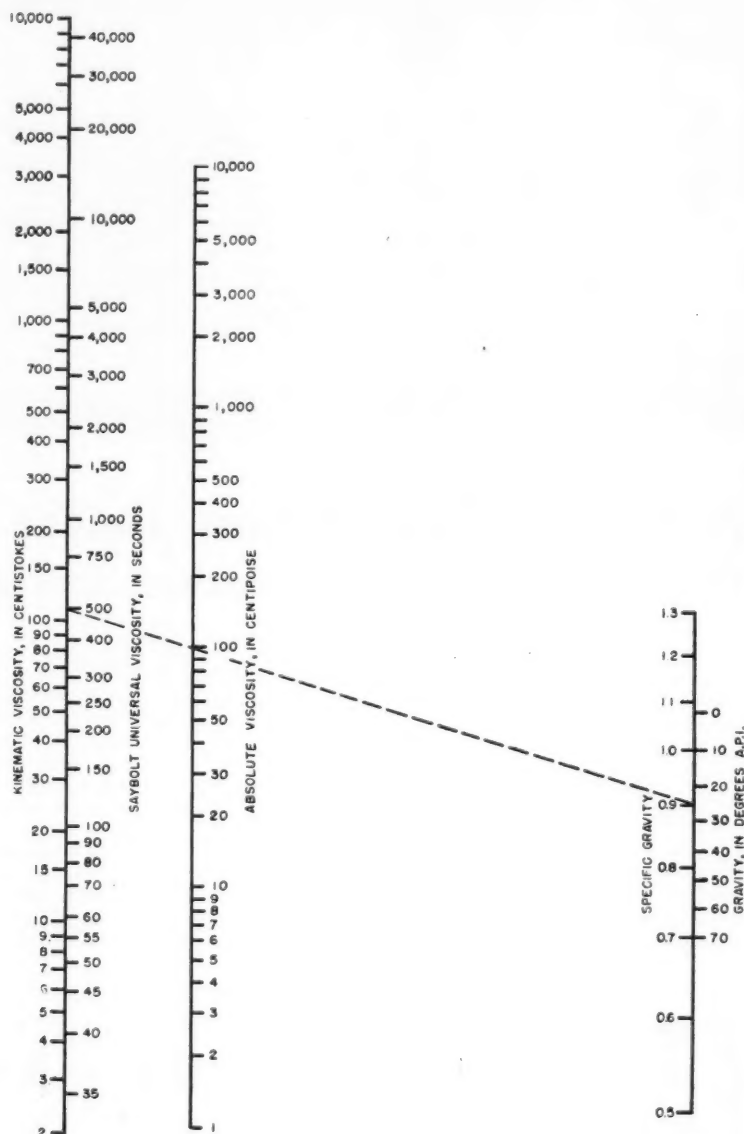
Nomograph courtesy  
NORTHERN PUMP COMPANY  
Minneapolis, Minnesota

Nomograph enables user to find kinematic viscosity of oils when absolute viscosity and specific gravity are known.

### Typical Example

Absolute viscosity of sample oil is 100, specific gravity is 0.9. What kinematic viscosity will it have?

Connect 0.9 on specific gravity scale with 100 cp on the absolute viscosity scale and read 500 seconds on the Saybolt Universal scale.




# valves

4" to 72"

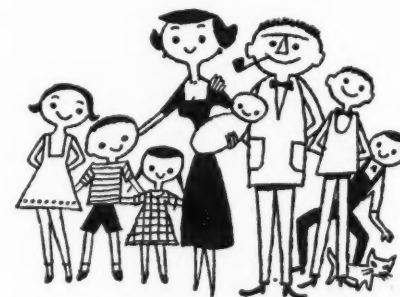
Standard and custom-built in cast iron, cast steel, fabricated steel or special alloy to your specifications. Designed for hand-wheel operation, quick opening, or for hydraulic operation either by hand or power pump.

Send us your inquiries.

**SEMET-SOLVAY ENGINEERING DIVISION**  
Allied Chemical & Dye Corporation

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When inquiring check 1452 opposite last page



## alphabetical index on page 217

... for alphabetical index of all processes, materials, services, and equipment discussed in this issue's editorial columns and advertisements, turn to page 217. "Quick-locator" starting on that page was a feature in **CHEMICAL PROCESSING** years ago. It means extra work for the Editors, but it helps you, the reader, in finding what you want ... in a hurry!



## Pharmaceutical Gains

(Continued from page 41)

With a vigorous public health program underway, for example, India sharply increased imports of bulk streptomycin from the US in 1955 and during the first six months of 1956. Conversely, US shipments of streptomycin to Brazil in 1955 dropped 45 percent below the previous year's level, partially due to dollar exchange limitations.

Attempting to foresee the exact course of international trade is like trying to predict next month's weather. With nationalism becoming an increasingly powerful force around the world, economic storm clouds can gather quickly, as they did in the Suez area. In general, however, completion of new American plants abroad should help overcome trade barriers and provide another element of strength for the pharmaceutical industry in 1957.

Quite apart from its traditional service to the medical profession, the industry today has reached into many new markets beyond the field of human medicine. Because antibiotics have saved literally millions of lives, they often are thought of exclusively as human medicines. Antibiotics today still account for the biggest single share of ethical drug sales in retail pharmacies — about 35 cents out of every prescription dollar. But they have also become important economic weapons in industry and agriculture.

Research has shown antibiotics to be effective in staving off bacterial spoilage of poultry, meat, and fish, and in delaying post-harvest decay of vegetables. As a result of this research, two antibiotic products were marketed last year for extending freshness time of poultry.

In agriculture, antibiotics have already become a valuable asset, not only to combat crop and animal diseases, but to speed growth rate of poultry and livestock. Last year, another promising development came to the farm market — antibiotic feed supplements which increase the egg-laying rate of hens. All this means a better profit margin for the farmer, more and better food for the consumer, and expanding markets for the industry.

Vitamins, too, are finding new uses outside the field of human medicine. In 1946, production of industry-made vitamins totaled only about 2.5 million pounds. Today, production is well over 6 million pounds. Increasing use in pharmaceutical products accounts for some of this rate. But vitamins are also serving the farmer as a component of growth-promoting livestock feeds. In industry vitamins are enriching foods and beverages. These are trends that are likely to continue in the years ahead.

Intensive research, growing populations, new plants around the world, and a strong domestic economy — all these factors tend to indicate gains in the pharmaceutical industry's business volume in the year ahead. Beyond 1957, the industry's continued growth will be measured by its contributions to longer, healthier life in a more bountiful world.

# New Revolutionary Steam Trap

One large capacity seat for all pressures!



New Sarco Thermodynamic steam trap. Sizes  $\frac{3}{8}$  to 1" — each body as small as a tee fitting! Capacity is determined, not by a bulky body, but by the effective orifice, valve action, pressure drop and condensate temperature.

### 1. Cuts trap inventory

With the revolutionary Sarco TD steam trap, you use exactly the same trap...with exactly the same large capacity seat...for all pressures 10-600 psi...for heavy, light or no condensate load. Sizes  $\frac{3}{8}$  to 1".

### 2. All pressures 10 to even 600 psi!

...without changes or adjustments. Self-adjusting. High pressure construction...at a low pressure trap price!

### 3. Operates perfectly when pressure fluctuates

Absolutely no effect even from 600 to 10 psi! No water seal to evaporate. No adjustments.

### 4. Widest capacity range

Same large capacity seat for 10 as for 600 psi. Pressures of incoming air and condensate INSTANTLY AND FULLY raises valve head (disc), permitting maximum discharge.

### 5. Operates equally well on all loads

The same Sarco TD trap for heavy, light or no condensate load. No prime to lose. No adjustments.

### 6. No oversizing worries

You can size the new Sarco TD steam trap for peak condensate loads...without risk of blowing steam on light loads...no prime to lose...no adjustments.

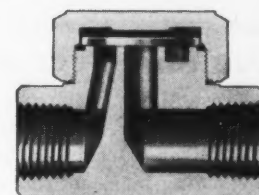
### 7. No steam leak required

...to operate the revolutionary Sarco TD steam trap (Pat. Pending). Closes tight against steam!

**Convince yourself by 60-day trial...use coupon**

# SARCO

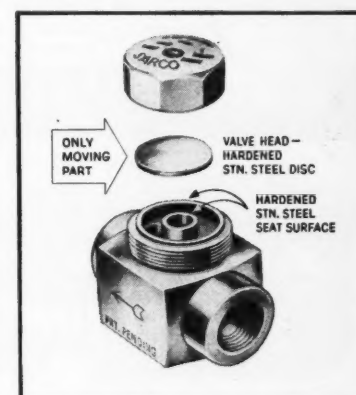
When inquiring check 1453 opposite last page



### Trouble-free design

Here is a trap so simple, it doesn't even have a valve closing mechanism. The kinetic energy of steam closes the valve. ONLY the new Sarco TD uses this operating principle.

No mechanism parts to wear or stick. No narrow channels to choke. No gaskets to leak.



### Maintenance practically eliminated

The all-stainless steel Sarco TD has only 3 parts...cap, disc and body. Only moving part is a hardened SOLID stainless steel disc, practically wear-proof.

**SARCO COMPANY, INC.**  
Empire State Bldg., N. Y. 1, N. Y.

Please send me Sarco TD Steam Trap and strainer for 60-day trial. Size \_\_\_\_\_ For use on \_\_\_\_\_

Name \_\_\_\_\_

Firm \_\_\_\_\_

Address \_\_\_\_\_

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SYN-2

To keep **ACIDS**  
and **CHEMICALS**  
in their places...

**you can't beat ALLPAX!**

These Allpax Packings shed acids and chemicals the way a duck sheds water. Available in ring, spool or coil form. Both are the result of extensive laboratory research, and contain an acid-resisting lubricant in a special bonding compound. For use on centrifugal and rotary pumps, valve stems, etc. Contact our research department for specific recommendations.

**Style No. 4**—Made from long strands of asbestos fibres, anti-friction metal particles and scales of high quality graphite. For temperatures up to 600°F.

**Style No. 5**—Compounded of long, tough strands of blue African asbestos fibres and fine flakes of graphite. For temperatures up to 550°F.

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See our complete line of packings, tools, and gasket materials. Distributors in principal cities.

**THE ALLPAX COMPANY**

160 Jefferson Ave. • Mamaroneck, N. Y.

When inquiring check 1454 opposite last page

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**ALLIED RADIO**

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EVERYTHING IN ELECTRONICS FROM ONE DEPENDABLE SOURCE

When inquiring check 1455 opposite last page

## The Leaders Speak

### Nuclear Field in '57

(Continued from page 47)

would remove one big obstacle to expansion of the nuclear reactor industry in this country.

The persistence of numerous security restrictions in the power reactor field and the amount of red tape involved in doing reactor business abroad represent other obstacles which, unless removed, can restrain progress in the year ahead.

Last year saw a number of important and favorable actions by the US Government. Noteworthy among them were the promise of nuclear fuel for American power reactors built abroad, the provision of outright grants for the purchase of research reactors and the arrangement of credit for foreign buyers of power reactors, elimination of the requirement that spent fuel elements be returned to the US for reprocessing, and finally, a substantial reduction in uranium reactor fuel prices.

Another development in the international atomic arena will probably begin to exert an influence by the end of 1957, and that is the initiation of the International Atomic Energy Agency under United Nations auspices. Although 1957 is expected to be largely a year of organization for the agency, its establishment can be expected to expand nuclear development around the world.

### Domestic Activity

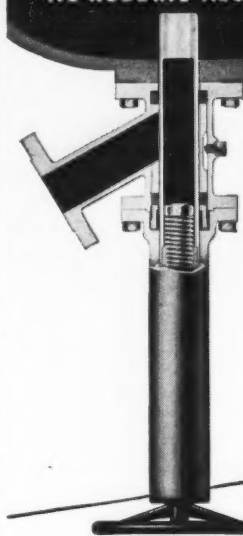
On the domestic front, probably acceleration of the power reactor development program by the Government will result in an increased level of industrial activity in this field. If the Government supports the construction of several large-scale nuclear power plants either here or abroad, the result will be an increased demand for nuclear equipment and materials, and increase in amount of near-term business available to companies active in reactor design and construction.

Continued expansion of nuclear naval and aircraft programs, all sponsored by the Government, will in 1957 support growth of the nuclear industry independent of general business conditions.

Acceleration of the power reactor field also may come from the outstanding success of some experimental reactor system now under construction or from discovery of a new reactor concept of great economical as well as technical promise. We are pushing ahead on nine different reactor concepts and the outstanding success of any one of these reactor experiments would certainly have impact on all competitive systems and their proponents as well as on the whole power reactor industry.

The present state of the reactor art leaves plenty of opportunity for scientific break-throughs, any of which might improve the efficiency of reactors, lower the cost of power they produce and thus add new impetus to the field.

**NO RODDING NECESSARY!**



**Strahman**  
**RAM TYPE**  
**Drain Valves**

**The Only  
Drain Valve  
That Cannot  
Clog Up!**

In the closed position the piston or ram extends up into the tank, preventing plugging of the outlet.

In the open position with piston fully retracted, there is no resistance to flow of materials drained from the tank.

Made in any cast metal to meet your requirements.

Designed for bolting to existing flanges. For special adaptations and for jacketed vessels, adaptor pads are available.

**Full Specifications on Application**

**STRAHMAN VALVES, INC.**

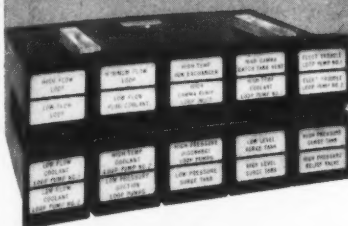
16 Hudson Street  
New York 13, U. S. A.

When inquiring check 1456  
opposite last page

CHEMICAL PROCESSING



## Never Before Such A Versatile, Low Cost ALARM SYSTEM!



### SCAM DU-ALL (Patent 2,730,704)

Scam Model SC-10 DU-ALL annunciator systems introduce new standards for compactness, usefulness and economy. Available in four standard cabinet sizes with Scam's unique plug-in relays, plug-in light boxes with 2-section back lighted nameplates. Each plug-in and light box combination provides alarm indication for two separate and unrelated field conditions... Write or phone for information on your specific alarm problem.

#### ALARM SEQUENCE:

Normal: lights off, horn off  
Abnormal: lights flashing, horn on  
Reset: lights bright, horn off  
Normal again: lights off, horn off

#### Features of the SC-10 MODEL

1. Interchangeable with standard Scam systems.
2. Operates with normally open field signals.
3. Optional Lock-in of momentary alarms.
4. De-energized circuit (no-drain).
5. Photograph illustration above with 20 alarm stations requires panel area of only 7 1/2" high x 17 3/4" wide.
6. Two lamps for each indication.
7. Economical.

### THE SCAM INSTRUMENT CORP.

Chicago 18, Illinois  
Phone IRving 8-9334

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When inquiring check 1457  
opposite last page

#### The Leaders Speak

Continued progress for the nuclear instrument industry is anticipated during 1957 regardless of general business conditions. This growth will stem from expanded research and development of research and power reactors and the broadening search for uranium in many areas of the globe.

The year ahead is certain to see rapid expansion in the industrial use of radioactive isotopes for process measurement and control, for industrial radiography and for myriad other purposes to which these materials have already been put. Development of many new applications, now envisioned but yet untried, will increase the savings realized by industry through the use of radioactive materials. Constantly rising industrial costs and increased competition in many lines — which would increase should business activity slow down — will lead many companies to apply radioisotopes in their efforts to make a better product at a lower cost. In industrial, agricultural, and medical research also, more and more benefits of the peaceful atom will be realized in the year ahead.

In summary, then, continued rapid progress in the non-reactor phases of atomic energy appears assured in 1957, while the rate of progress in the reactor area depends upon a variety of factors, several of which have little relationship to prospective economic conditions. Most signs, economic and otherwise, point to continued growth and solid technical progress for the atomic energy industry in the year ahead.

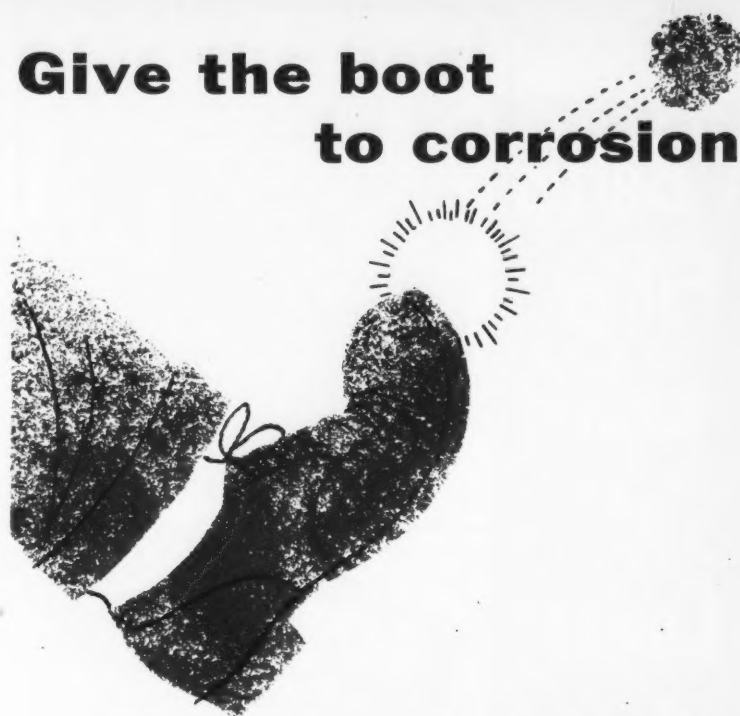
#### Make "time survey"

... and save money, especially if you're running a small business, according to Small Business Administration. Agency has even prepared a leaflet "Surveying and Controlling Executive's Time," no. 76 in SBA's series of Management Aids for Small Manufacturers, available at any of Agency's 40 field offices.

Leaflet points out that businessmen waste time and thus money because "time is an intangible." Since the average businessman has no record of how his time is used, he cannot see these time leaks. This fact points to the first step in improved planning and control of your executive time.

Stauffer has established another agricultural chemical plant at Phoenix, Ariz., making total of 17 such plants for Stauffer.

## Give the boot to corrosion



### ...with La Favorite Linings

Processing equipment, conveying lines and accessories, storage tanks—all give new equipment performance when you boot out corrosive attack and related evils that bedevil production schedules. Armor inside surfaces with La Favorite high-strength-bond elastomer linings. It's profitable.

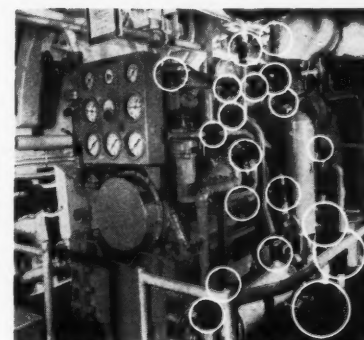
For details, ask for Bulletin No. 55.



Typical of the intricate shapes lined with La Favorite protective elastomer compounds.

### Give the boot to tremble and shake ...in pipe and duct lines

La Favorite all-rubber expansion joints give the boot to the tremble and shake in fluid conducting lines —take up stretch and shrink—give your duct and piping lines a calm performance that delays the point of no return. Details in data sheet —yours on request.



Nineteen La Favorite expansion joints in this naval power plant block the shivers in pipe lines.

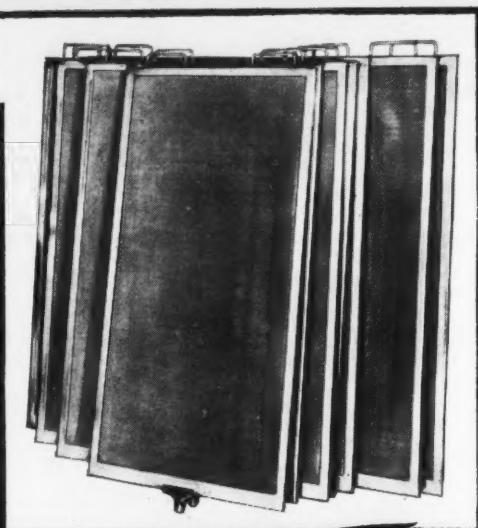
## LA FAVORITE Rubber Mfg. Co.

267 Wagaraw Road • Hawthorne, New Jersey

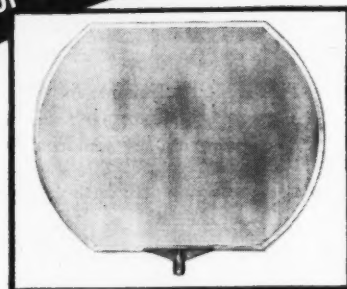
When inquiring check 1458 opposite last page

Square corner design and narrower rim yield increased filtering area.

# A Better Filter Leaf at Lower Cost



**RIM-LOK**  
for Pressure Filters



The "RIM-LOK" leaf for horizontal filters offers filtering area equal to that of other "H" type leaves.

- Absolutely leak-proof construction
- Smooth surface of frame facilitates cake discharge
- Stands up under heavy hammering

The "Rim-Lok" Filter Leaf overcomes the disadvantages inherent in ordinary pressure filter leaves—such as leakage and "bleeding" of filter aid due to rim bulge, rivet "give," poor sluicing, etc. "Rim-Lok's" ingenious construction provides these unique service features:

- 1—Lightweight, rugged chamber that provides improved support for the filter cloth covering.
- 2—Increased chamber capacity that assures low pressure drop for uniform precoating, even on the largest leaves.
- 3—Larger cross-sectional area of the frame permits better drainage of filtrate.
- 4—Increased filtering area with square corner design.
- 5—Lends itself easily to re-covering, without destroying the frame.
- 6—Lower initial cost and lower operating and re-covering costs.

Write for Bulletin 561

**MULTI-METAL WIRE CLOTH CO., INC.**  
1356 GARRISON AVENUE NEW YORK 39, N. Y.

When inquiring check 1459 opposite last page

## The Leaders Speak

### Nation's Economy in '57

(Continued from page 49)

starts in 1957 to level off close to an annual rate of 1 million, nine percent under the 1956 level and 20 percent below the 1950 and 1955 peaks.

Also, as for the near-term outlook, it seems reasonable to expect a slowing of the growth in outlays for industrial and commercial construction and a continued strong upward trend in business expenditures on producers' durable equipment.

Business investment inventories constitute one of the most volatile elements of our economy. It is the attempts of businessmen to adjust the inventory levels to changes in the economic pattern that have taken place, or that are expected to occur, that accentuate business recovery or decline.

### Net Investment Down

For 1956 as a whole, net additional investment in inventories probably will not exceed \$3 billion, in contrast with \$4.2 billion for 1955, even though the book value of inventories both for total business and for all manufacturing reached a point by early fall which exceeded the 1953 high by six percent and seven percent, respectively.

The rise in physical volume of stocks of goods has been more modest and it must be noted that dollar sales for both groups touched new highs this year. On the other hand, over the past year total business inventories (and manufacturers' as well) have risen faster than sales. The result has been that the ratios of stocks to sales have climbed back to the relatively high levels of late 1954.

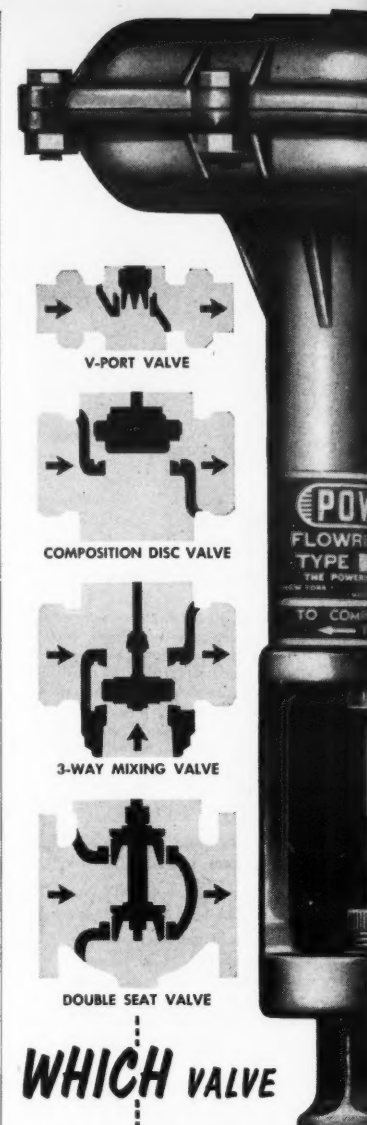
This trend is particularly noticeable in non-durable goods where sales have leveled off and inventories continue to rise. It is not likely that this movement will be maintained for much longer. Over the short-term, a correction will probably come via a rise in sales and a slowing of inventory accumulation rather than by liquidation of stocks.

Net foreign investment will be much greater this year than last, owing to an excess of exports over imports, although aggregate contribution made to our national product by this factor is relatively small. Over the long-run, as industrial development abroad continues, net foreign investment is expected to be more often negative (as it was from 1953 to 1955) than positive.

### Government Purchases

Government purchases of goods and services, which at current rates account for nearly one-fifth of gross national expenditures, are running slightly ahead of last year's, and the present outlook for control in this area is not encouraging. The prospect of any tax reduction in the near future is not bright in view of the dire need of stimulating savings and investment to support the growing economy.

In 1956 consumer expenditures on goods and



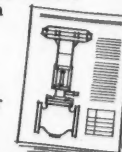
## WHICH VALVE

is best for your Control Problem?

Ask your nearest Powers representative which particular valve should be specified—he knows diaphragm control valves and their applications. You'll find him ready to help you in sixty-six cities throughout the nation.

Four Powers Flowrite Valve types are available to meet every requirement for accurate and dependable control. Actuated by compressed air or water, they may be used with any pressure-operated sensing device.

WRITE TODAY for information on all four valve types . . . ask for Bulletin No. 344.



THE POWERS REGULATOR CO. • SKOKIE 16, ILL.

**POWERS**

When inquiring check 1460 opposite last page

CHEMICAL PROCESSING



## The Leaders Speak

services, representing nearly two-thirds of total spending in the economy, exceeded 1955's record rate by about five percent. The rise in disposable personal income (after deduction of taxes) is probably greater, but some of the increase has been offset by higher savings.

The rise in personal income is accounted for largely by higher labor income resulting from an increase of about 1.3 million in the number of employed persons and an increase in wage rates. It may be expected that consumer spending will continue to rise with continued full employment and high incomes.

### Credit Conditions

There is rather general agreement that so far the Federal Reserve has done an excellent job in combating inflationary forces arising from monetary factors. Efforts have been directed toward restraining the expansion in the money supply, represented by bank deposits and currency in circulation. The goal has been to permit no more of an increase in the money supply than is required by normal economic growth.

A measure of the success of this policy is the fact that over the last two years, while demand generally has been exerting strong pressure against the capacity of our economy to produce, both wholesale and retail prices have remained relatively stable.

The ever present danger, of course, is that restrictions on the money market can be carried too far or too long, to the point where they will have a deflationary effect. Such a result might be a lot more difficult to counter than the present situation.

### Prices

Consumer prices particularly have shown remarkable stability over the last two years. However, it is apparent that recent advances in wholesale prices, notably in steel, have not yet been fully reflected at retail. When they are, and escalator clauses have forced wages up another notch, the first round of the circular course will have been completed.

It is not an enlarged money supply but rather the wage-price spiral which is the primary inflationary factor with which we must contend. Obviously, the present conditions and outlook require courageous and unselfish decisions on the part of our monetary authorities, businessmen and unions to hold back inflationary forces.

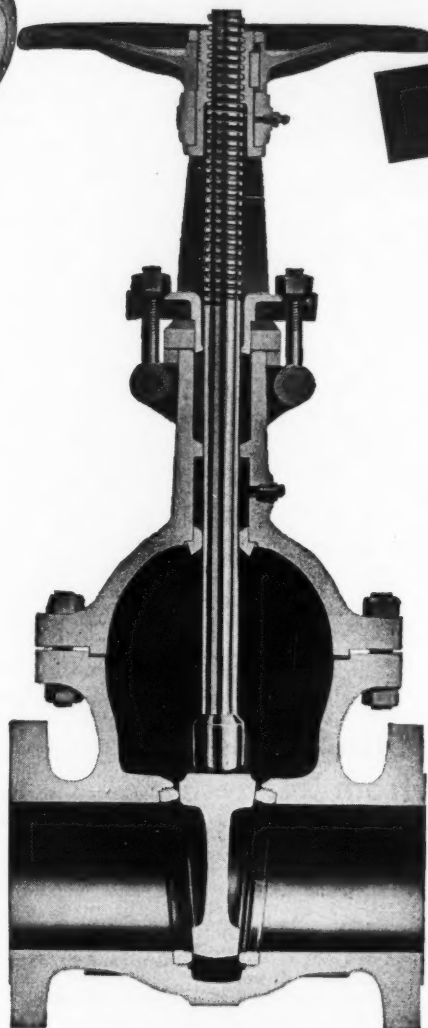
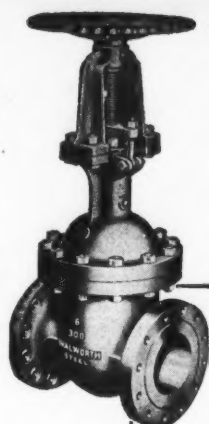
Monsanto plans a major expansion of phenol capacity at Monsanto, Ill. Cost will be several millions; increase will add about 25% of company's capacity.

# WALWORTH

## Cast Steel Gate Valves

Series 150 and 300

Wedge Gate — Outside Screw and Yoke



Sectional view of Series 300

**Big 8-Point Superiority!**

Gland clearances are such that stem cannot be scored if gland should be tightened unevenly.

Deep Stuffing Boxes in all sizes (2" to 24") insure tightness and maximum packing life — costly leaks are eliminated.

Bonnets and Bodies are engineered to withstand pressure and minimize distortion — they're tough, durable, dependable.

Heavy Steel Walls provide extra strength and longer life.

Integral Body Guide Rib Faces are machined to insure accurate disc seating.

Seat Rings are bottom seated — not flange type. No recess exists at back of ring — hence no turbulence, erosion, or pressure drop.

Streamlined Ports allow high velocity, non-turbulent flow, and reduce the possibility of erosion.

Valves regularly have flanged ends. They can be supplied with ends for butt welding. Roller bearing yokes are available. On valves 5 inches and larger, by-passes can be furnished.

For Series 600 and higher, we recommend Walworth Pressure-Seal Steel Gate Valves.

For further information on Walworth Cast Steel Gate Valves, see your local Walworth distributor, or write:

# WALWORTH

Manufacturers since 1842

valves • fittings • pipe wrenches

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DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

When inquiring check 1461 opposite last page

## New QUAKER hose for hot air ducting cuts heat loss up to 57%



### Synthetic fabric jacket and silicone tube retain temperatures from upstream to downstream end

Made in continuous lengths up to 50', this new Quaker hose easily withstands temperatures as high as +450°F; as low as -80°F.

As the above diagram shows, the hose keeps heat loss—and therefore energy loss—to a minimum. (Comparable outside temperature of ordinary hot air ducting material, such as stainless steel, would be about 400° F.). Both the silicone tube and the synthetic fabric jacket of Quaker's new hose hold the heat!

Other advantages? The hose is light-

weight and fully flexible. And it resists abrasion.

Available in either single or double jacket, the hose comes in 1" to 4" I.D.'s. Sizes 1" and 1½" I.D. can be made in 30' continuous lengths; 1½" to 4" I.D. in 50' lengths. The hose takes regular expansion and shank hose couplings.

Want more information? Write to: **H. K. Porter Company, Inc. Quaker Rubber Division, Philadelphia 24, Pa. or Quaker Pioneer Rubber Division, Pittsburg, Cal.**

**HKP** QUAKER RUBBER DIVISION  
QUAKER PIONEER RUBBER DIVISION  
**H. K. PORTER COMPANY, INC.**

When inquiring check 1462 opposite last page

## The Leaders Speak

### Tight Money, Increased Competition

(Continued from page 57)

going to have to learn how to live with it, which means learning how to utilize the technical talent we have more efficiently.

Perhaps, for example, it may be possible for technical people in line functions such as technical service, market development, market research, and even sales, to bring their knowledge of economic factors to bear at an earlier stage in the product development procedure, so that work at the research level can be guided more directly into profitable channels.

At the same time, through such efforts as the Manufacturing Chemists' Association's program on education, we are going to have to continue to aid and encourage the schools in their endeavor to prepare more qualified young people for careers in science.

### Confidence

In the past decade businessmen have had for the first time sufficient economic data to provide a sound basis for long range planning. In the chemical industry, for example, we have what we feel is a reasonably accurate idea of what the minimum requirements for most major chemicals will be in 1975. The same is true for other basic industries. As a result, business confidence today is not only at a high level but it is on a much sounder footing than it has been at other critical times.

However, we must recognize that despite the validity of the long term projections, temporary interruptions in the trend are bound to occur. Also, it is a fact that the machinery necessary to supply a growing economy has become more rigid. No longer is it possible simply to close down a plant to accommodate temporary slack periods. Other methods of tiding over must be found. Our long term planning must, therefore, anticipate the temporary dislocations and make provisions for them as well as for attainment of the major goal.

The long range outlook for the chemical industry has never been brighter. As the traditional raw materials of industry become scarcer, our economy is moving ever further toward dependency on chemical upgrading of cheaper and more plentiful materials.

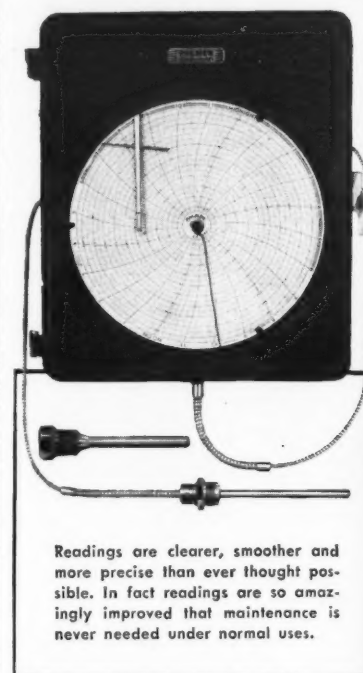
If chemical company management and stockholders will keep this in mind and provide for and treat interruptions in the trend as the temporary things that they are, we will have nothing to fear in 1957 or any year of the long period of growth that lies ahead for this industry.

Republic Chemical Corporation has completed installation of additional equipment for copper sulfate plant at Curtis Bay, Baltimore, Md. Total cost of installation is about \$1 million.

# PALMER

## MERCURY ACTUATED recorders

Into this modern Mercury Actuated Recorder has gone all the skill of Palmer master craftsmen.



Readings are clearer, smoother and more precise than ever thought possible. In fact readings are so amazingly improved that maintenance is never needed under normal uses.

Recording Thermometers feature twelve inch die-cast aluminum case with black wrinkle or white satin finish. Single or multiple pen construction. Electric or spring wound clock, 24 hour or 7 Day Revolution. Flexible Armor and bulb of stainless steel. Ranges —40 to 1000°F. or Equivalent in °C.

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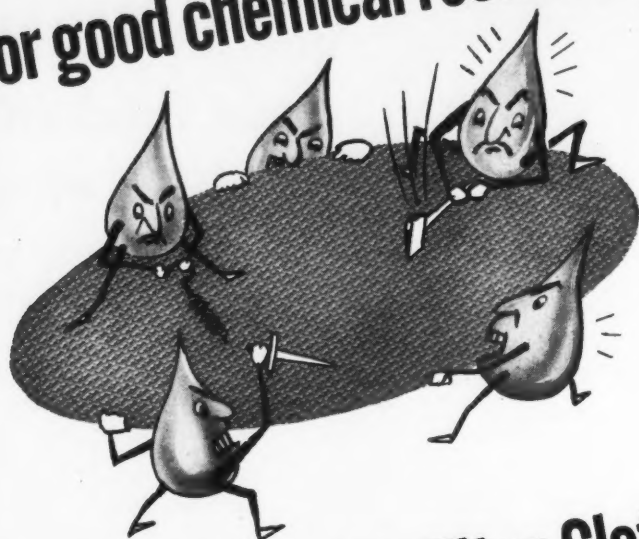
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## PROCESSES, EQUIPMENT and MATERIALS

Use this "quick-locator" when you want information on a specific type of process, equipment or material mentioned in the processing stories or the advertisements in this magazine. Everything discussed in this issue is given here, if you want more data you can write manufacturer direct . . . or turn to inside back cover and use the convenient "Information Request Slip." This is a special service provided by the publisher . . . no obligation or charge, of course. The publisher contacts the proper manufacturers for you—information comes to you direct.

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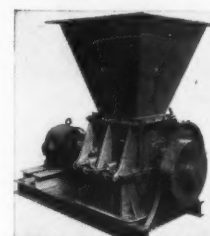
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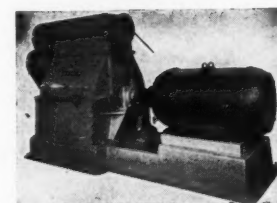
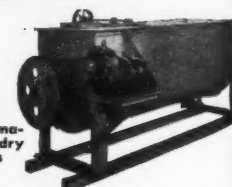


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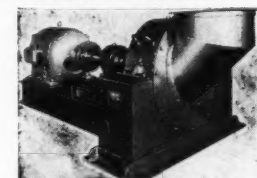
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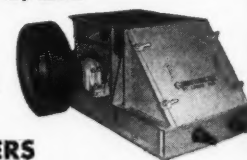
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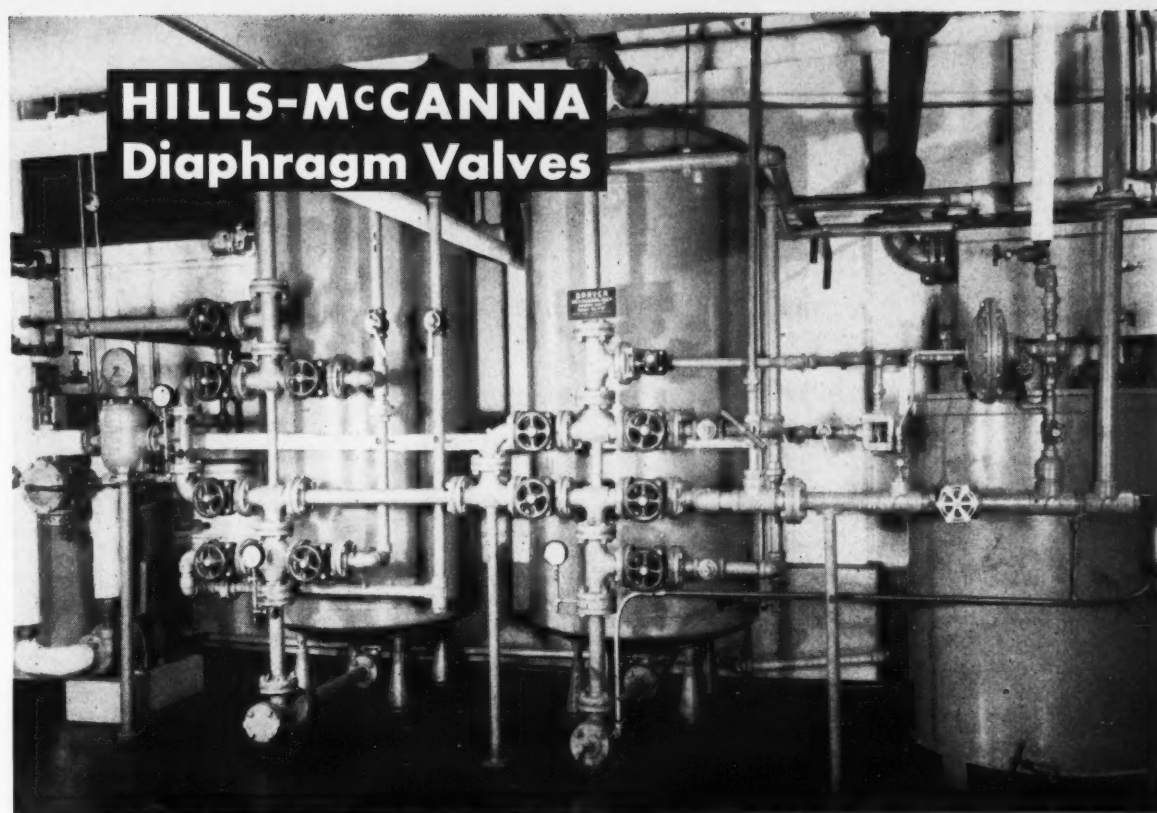
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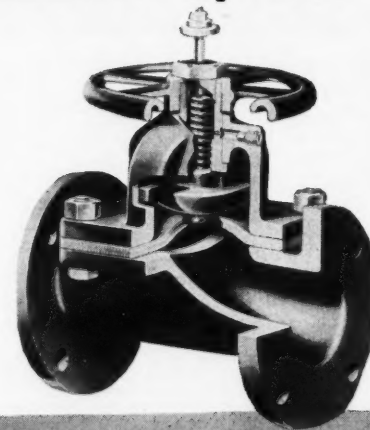
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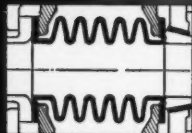
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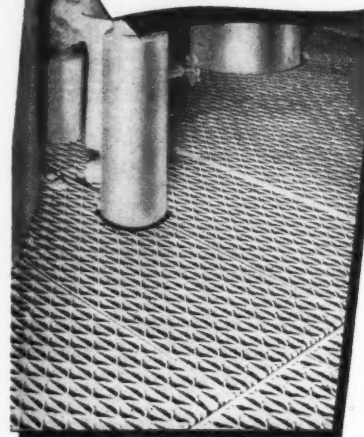




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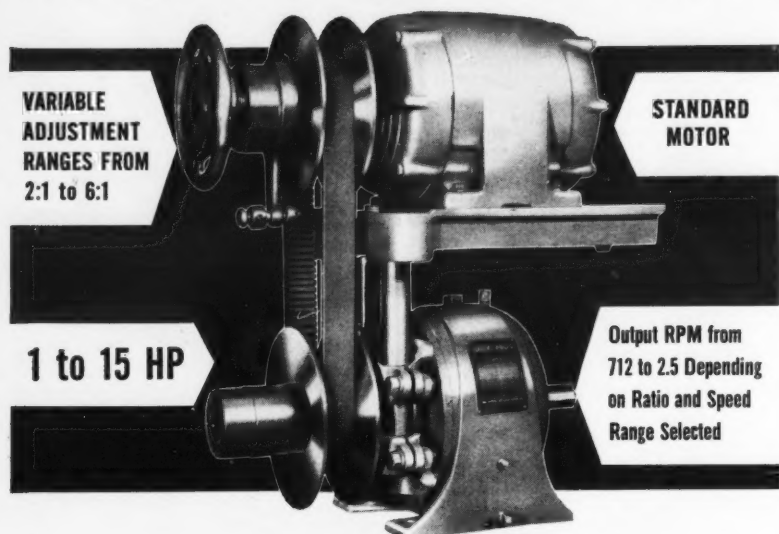


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**HKP** **W-S FITTINGS DIVISION**  
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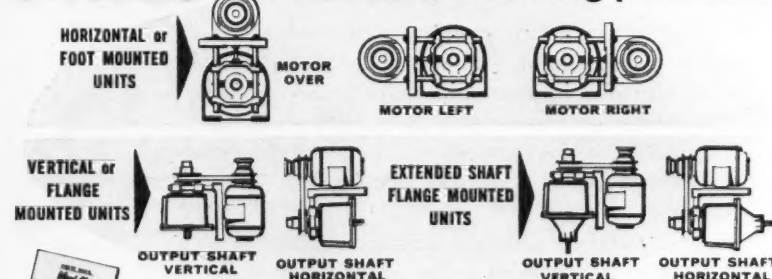
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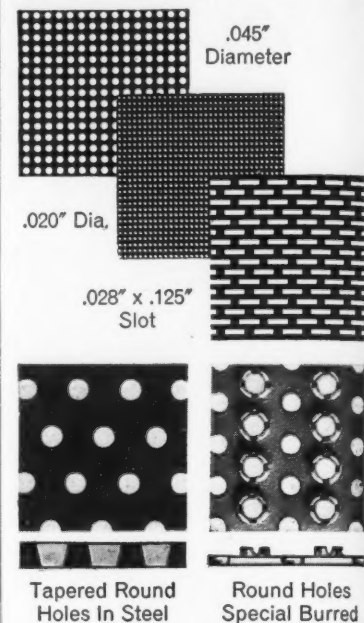


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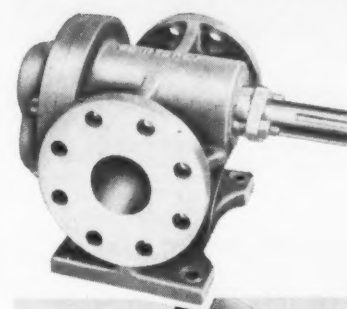
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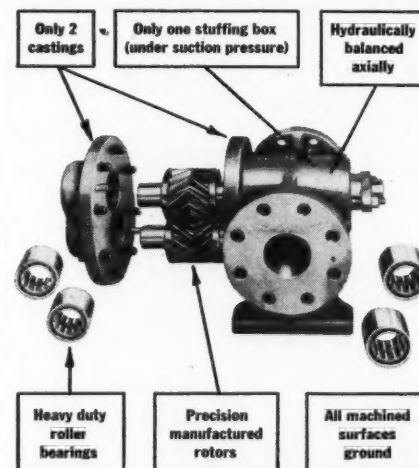
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High capacity • High efficiency  
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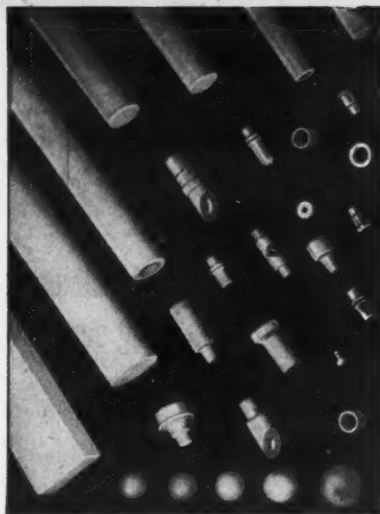
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## Sier-Bath ROTARY PUMPS



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DURAMETALLIC is ready to help you with those stuffing box problems . . . we've been doing it for industry for 38 years. Experienced factory-trained sales and service engineers are located in all sections of the U.S.A.

Without charge, a staff of research and development engineers at our Kalamazoo plant are ready to help you with your sealing needs.

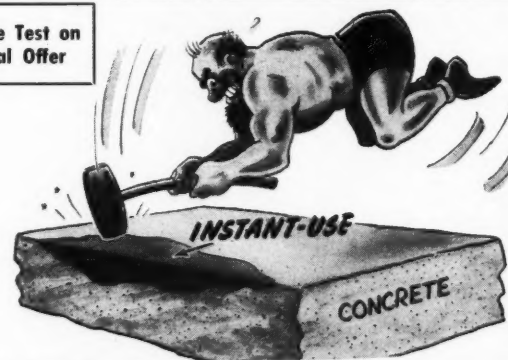
When seeking an answer to satisfactory sealing . . . put it up to Durametallic.

Write Today for Bulletin File No. DM-CP

**DURAMETALLIC CORPORATION**  
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Tough, Fast Repairs!

## INSTANT SETTING FLOOR PATCH

Repair broken factory floors without the usual traffic tie-up. Simply shovel INSTANT-USE into hole or rut—tamper smooth—truck over! No waiting! INSTANT-USE bonds tight to old concrete—right up to a feather edge. It's tough. Wears like iron. Won't crack or crumble. Install complete overlay where floors are badly chewed up. Used indoors or out. Immediate shipment.

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Please send me complete INSTANT-USE information, details of TRIAL ORDER PLAN and Free INSTANT-USE BROCHURE — no obligation. (Clip and attach Coupon to company letterhead).

Name .....  
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To get more information on products—use the Reader Service slip . opposite this page

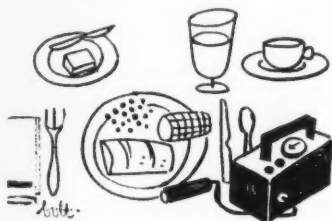


**THAT'S  
INTERESTING**

(Continued from page 2)

#### "Hot" meals

Some 200 members of the staff of Midwest Research Institute have perhaps one of the most unusual afternoon coffee breaks—a light snack of irradiated foods. Four foods: hamburger, haddock, corn, and lima beans



are treated with a chemical additive, irradiated, and cooked. Employees sample food specimens and report their reactions to taste and odor.

The "hot" meals are served as part of a program to find chemical additives which might protect against flavor damage taking place during radiation sterilization.

#### Checks pay off in "scents"

Perfumed ink is being used to print checks for a Winton, Conn., perfume manufacturer. The payee line reads: "Pay to the odor of", and dollar amount is followed by the amount of "scents".

In this trend to make the customer conscious of his dollars and scents a bakery has checks with the aroma of newly baked bread; a spaghetti maker sends his out "with just a touch of garlic." (Denver Post)

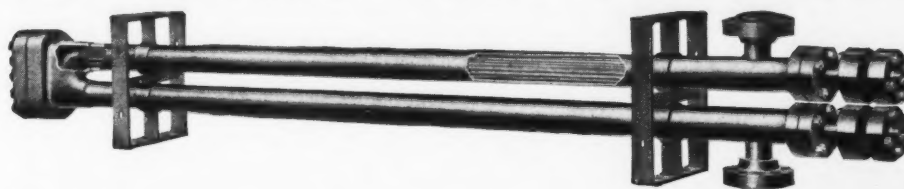
#### Tile color tastes

Plastic tile molders have found that light pastels dominate tile color demand on the East Coast, changing gradually to vivid marbled colors popular in the southwestern area. In the Midwest, demand is for a pearly finish.

For more information on product at right, specify 1480 . . . see information request blank opposite last page. ➡

*Prevent this Waste!*

## BROWN FINTUBE SECTIONAL HEAT EXCHANGERS

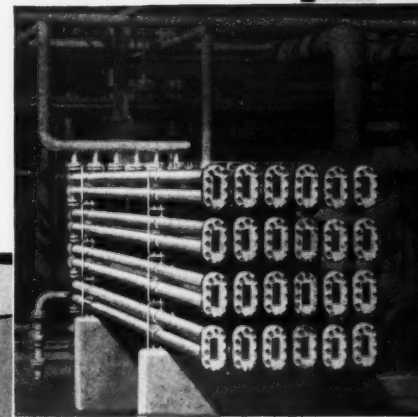


*Eliminate Obsolescence  
and Waste in . . .*

**PILOT PLANT,**

**SEMI WORKS and**

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● Modular design;— can be changed quickly from one product and duty to another by simply adding or removing sections or changing series-parallel manifolding. Pilot operations enlarged easily to semi-works or full plant by direct multiplication keeping all conditions in same relationship. Standard sizes. Interchangeable. Pressures to 22,000 psi. Mild steel, alloy or non-ferrous construction.

## BROWN FINTUBE COMPANY

*Elyria, Ohio*

Engineering and Sales Representatives in the Principal Cities

## SOMEBODY GOOFED!

Only by a freak of fortune does the leaning tower of Pisa still stand. A faulty foundation was not apparent until the structure was three stories high. It is believed the architects were then forced to compensate by adding weight to the opposite side to save the building.

Are you building corrosion problems into your plant structures and equipment that will inevitably have to be compensated for by tremendous replacement costs? Many of these costs can be eliminated *at the planning stage* by taking advantage of the services of an expert in the field of corrosion resistant coatings... the Amercoat Sales Engineer.

The Amercoat Sales Engineer is trained in the principle that in corrosion engineering, too, foundations are all-important. You can put this factory-trained man on your staff, so to speak, without cost or obligation. His advice will be truly objective since it is based on a knowledge of all types of protective coatings and more than 43,000 case histories in our files. You can be sure that the Amercoat coating he recommends, whether vinyl, phenolic, epoxy or any other type, will be the right one for *your* job, and the most economical on the basis of cost per square foot per year.

Therefore, to effect important economies in specifying protective coatings you are cordially invited to call on your Amercoat Sales Engineer... *right at the beginning*. He will analyze all per-

tinent data concerning your corrosion problems based on our nearly 20 years of corrosion control experience, and give you a comprehensive recommendation. In addition to recommending the proper coatings, he will assist you in writing complete specifications. However, this is not the full extent of his service: he will also be available for consultation at the job site to insure proper application.

There are more than 70 Amercoat Sales Engineers and Distributors located throughout the country. It will pay you to talk to one of these men whether you are building a new plant or are interested in the efficient maintenance of existing facilities. The same service is available and equally important savings can be realized in both cases.

May we send you the name of the Amercoat man nearest you? Literature containing many helpful suggestions for the design and corrosion engineer is also available on request. Write to: Amercoat Corporation, 4809 Firestone Blvd., South Gate, Calif.

"Follow the Line of  
MOST Resistance"

**Amercoat**

CORPORATION Dept. PA

4809 Firestone Blvd., South Gate, Calif.

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